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MIOCENE MOLLUSCA OF NORTHERN COLOMBIA

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INTRODUCTION

The purpose of this paper is to contribute additional information of the rapidly increasing knowledge of the Caribbean Miocene deposits of northern South America. During the course of geologic investigations in Colombia the writer was afforded opportunity of making collections in horizons ranging from Cretaceous to Quaternary in various parts of the country; but at this time only a few notes on the Miocene paleontology can be given. Permission to publish has been most generously granted by Mr. J. E. Brantly of the Colombian Atlantic Refining Company to whom the writer has been constantly indebted for his interest and co-operation.

Whenever possible the Colombian specimens have been compared with other Caribbean Miocene forms in the Paleontological Laboratory of Cornell University, ably presided over by Prof. G. D. Harris, to whom I am grateful for publishing this article, and with whom it has been a constant source of pleasure to be associated. On this occasion, also, I wish to offer my thanks to Mr. George L. Green and Mr. C. C. Addison for their co-operation in collecting the material.

GENERAL NOTES

The marine Miocene deposits of Colombia are widespread in their occurrence. According to Anderson[1] they occur from Rio Hacha westward to the Gulf of Urabá and to unknown distances in the valleys of San Jorge and Sinu rivers. The writer has made collections in the departments of Atlantico, Bolivar and Magdalena and is cognizant of a great thickness of Miocene beds in the Atrato river valley. Deposits which are contemporaneous in age to a portion of the Miocene section of Colombia are known in the state of Falcon, Venezuela, and in Trinidad as well as in Costa Rica, the Canal Zone, Panama, San Domingo, and Mexico. In Colombia these formations are composed, for the most part, of sandstones, shales and marls.

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[1] Anderson, F. M., Original source of oil in Colombia : Bull. Amer. Assoc. Pet. Geol., Vol. 10, No. 4, pp. 382-404, 1926.

Literature pertaining to the paleontology of the Colombian Miocene is rather scant, although there is considerable that has been written on related areas. The short paper by Pilsbry & Brown[2] on "Oligocene fossils from the neighborhood of Cartagena, Columbia" was the first short systematic treatise dealing with some of the mollusca found in what are now regarded as Miocene beds near Cartagena. In 1919 Cooke[3] listed a number of forms from a few of the same localities from which the present fauna is described, and recently Anderson[4] has presented a brief review of the stratigraphy of a portion of the Miocene section in the department of Atlantico giving a list of some of the more characteristic forms from "Stage M". This is a coarse sandstone, quite fossiliferous, and possibly rests unconformably on the underlying older formation. It is Anderson's belief that this stage is older than any other similar group of the Miocene in Colombia.

Mr. George L. Green and the writer made two collections in the Department of Atlantico, one between Las Perdices and Puerto Colombia from a light brown sandstone and the other near Usiacuri from an earthly brown marl. Mr. Addison made several collections from various localities along the coast and to the south. Under the description of each species its locality will be given. In the Department of Magdalena, Miocene fossils were found at various intervals south of Fundacion, near Paraiso and between Paraiso and Flores de Maria. The material is predominantly sandstone, generally dirty gray in color altho sometimes reddish or yellowish brown depending upon the amount of oxidation of the iron present. The Miocene sediments south of Fundacion appear in places to unconformably overlie the igneous materials comprising the western flank of the Santa Maria mountains. About eight kilometers or so south of Calamar and at Buenavista, Miocene hills fringe the margin of the Magdalena river and dip to the southeast. The Miocene sediments of the Department of Bolivar between Zambrano and

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[2] Acad. Nat. Sci. Phil. Proc., Vol. 69, Pp. 32-41, 1917

[3] U. S. Nat. Mus. Bull. 103, Pp. 588,589, 1919

[4] The marine Miocene Deposits of North Colombia: Calif. Acad. Sci. Proc., 4th ser., Vol. 16, No. 3, Pp. 87-95, 1927.

Jesús del Monte on the road to Carmen, dip to the southeast monoclinally away from the older sediments forming the folds of the central range of hills. In the section from Zambrano to Carmen two collections were made, one about four kilometers east of the hacienda of Esperanza, the other just east of Jesús del Monte on a strike ridge of sandstone overlooking the town. The thickness of Miocene in the Zambrano-Carmen section may approach as much as five thousand feet. The fossils from Jesús del Monte are stratigraphically lower than those east of Esperanza.

The conclusion that the fossils are of Miocene age has been arrived at by correlation with other known species from Caribbean Miocene deposits and by the stratigraphic relations of the beds.

DESCRIPTION of SPECIES

Class PELECYPODA Goldfuss

Order PRIONODESMACEA Dall

Superfamily ARCACEA Deshayes

Family ARCIDÆ Dall

Genus SCAPHARCA Gray

Scapharca grandis colombiensis Wiesbord, n. subsp. Pl. 1, Fig. 1

Arca grandis Pilsbry, Acad. Nat Sci. Phil. Proc., Vol. 73, Pt. 2, P. 404, Pl. 40, Fig. 1, 1921 (Not of Broderip & Sowerby?).
Cf. Scapharca (Scapharca) patricia Maury, Bull. Amer. Pal., Vol. 10, No. 42, P. 57, Pl. 2, Fig. 5, 1925.
Arca aff. grandis Cooke, U. S. Nat. Mus. Bull. 103, P. 588, 1919.

This is a large, thick-shelled form ornamented with 25 to 28 strong, radiating ribs. These may be somewhat rounded or flattened on top and are generally of the same width as the well channeled interspaces. Concentric growth lines impart a beaded appearance to the radiating costæ, the development of which varies on different specimens. On nearly all shells, however, the beading is more strongly pronounced than on the recent Pacific form known as *Scapharca grandis*. Otherwise the fossil and recent forms are very similar.

The outline of the shell is generally obtusely triangular with a marked tendency to become swollen when adult, especially near the ventral margin. Posteriorly it is somewhat attenuated and truncated. The cardinal area is broad and high. Some specimens show a downward projecting growth of calcium carbonate over the anterior muscle scar resembling somewhat a modified uvula of the human throat. This is well developed on some of the larger forms of the recent *grandis.*

Dimensions: Alt. 93 mm; Long. 93 mm.

This is a varietal form of the widely distributed fossil generally referred to as *Arca grandis* or *patricia* depending upon the interpretation of the describer. In 1850 Sowerby[5] described but did not figure a species from Santo Domingo which he called *Arca patricia.* In discussing it he said: "Distinguished from *A. grandis* by its form, which is much more rounded at the inferior margin; by the angularity of its radiating ribs, which are moreover more numerous; and by the narrowness of the line formed by the row of hinge teeth, and the recurved posterior of the same row."

Thinking that *Arca patricia* resembled *Arca grandis* (an inference derived from Sowerby's comparison with *grandis*) Gabb[6] later decided that a suite of *Arcas* which he collected from Santo Domingo were really identical with the recent *grandis* and relegated the name *patricia* to synonymy. Gabb also subsequently regarded *A. chiriquiensis* a synonym of *A. grandis,* but the former is now regarded as a distinct species.

In revising Gabb's material, Pilsby[7] considered that the extremely large *Arca* in the Santo Domingan collection was not the one that Sowerby meant to be *patricia* and suggested that *A. chiriquiensis* might be the species Sowerby had in mind for *patricia.* Hence he called the larger form *grandis* believing the fossil to be similar to the recent form. Maury[8] previously, however, considered the large *Arca* as *patricia,* and recognizing a difference between it and the recent *grandis* decided to retain the name originally given by Sowerby.

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[5] Geol. Sec. London, Quart. Journ.; Vol. 6, p. 52, 1850.
[6] Amer Phil Soc Trans., n. ser., Vol. 15, P. 253, 1873.
[7] Acad. Nat. Sci. Phil. Proc., Vol. 73, P. 404, 1921
[8] Bull. Amer. Pal., Vol. 5, No. 29, p. 338, 1917.

Note : Change Pilsby to Pilsbry, pp. 6 - 8

The larger *Arcas* in the Santo Domingo collection are undoubtedly very close to the recent *grandis* altho the majority have higher and narrower umbos.

In order to clear up this "picturesque muddle" Woodring[9] sent for a cast of the holotype of *patricia* and found that it is very different from either *grandis* or *chiriquiensis.* Woodring found the cast to be identical with *Scapharca tolepia* Dall and the synonymous *S. arthurpennelli* Maury. If this is so it clears up a clouded situation. There is one point to be considered however. Is the cast of the holotype actually of the shell that Sowerby meant as *patricia*? There are several reasons for entertaining some doubt. In the first place there is no resemblence between adult forms of *tolepia* and *grandis.* Why then did Sowerby compare his specimen with *grandis*? Why did he give it the name *patricia* which in itself indicates a noble, patrician form. Neither *tolepia* or *arthurpennelli* would be grand enough to suggest the name *patricia.* And finally the fact that there are large shells that closely resemble the recent *grandis* makes us believe that the true *A. patricia* may be the *A. patricia* of Maury or the *A. grandis* of Gabb.

Woodring, however, has penetrated as far into the heart of the situation as may be possible. If the holotype cast truly resembles the *patricia* of Sowerby, misinterpretations have been rectified. If the type has been lost, mislabeled or mishandled the matter still stands subject to diverse interpretations.

In naming the Colombian specimen a subspecies of *grandis* I am conforming with Woodring's suggestion. It is undoubtedly very similar to the recent form of *grandis* but inasmuch as there are recognizable differences and to avoid more ambiguity in the literature I have decided to call it under the subspecific name of *colombiensis.* Pilsby has several forms from Colombia which he regards as the true *grandis.* Our form I believe is identical with the one Pilsbry figured. It is also very close to *A. patricia* Maury from Trinidad.

Localities.—Usiacuri; near Puerto Colombia; near Piedras de Afilar, Dept. of Atlantico, near Cartagena, Dept. of Bolivar.

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[9] Science, Vol. 62, No. 1614, pp. 518, 519, 1925.

Age.—Middle—Upper Miocene.

Distribution.—Nearly identical forms are found in Venezuela, San Domingo, Trinidad and Tobago?

Scapharca grandis var. **cedralensis,** n. var. **Pl. 1, Figs. 2, 3.**

This form seems to represent still another varietal phase of *grandis*. It differs from *colombiensis* in having a somewhat thinner shell and in being less swollen. The number of ribs vary from twenty-five to twenty-eight. These are strong, quadrate, separated by well channeled interspaces of the same width as the ribs. The shell is obtusely noded generally on the anterior. Many specimens have a shallow but broad sulcus ventrically.

Dimensions: Alt. 60 mm; Long. 65 mm.

This species appears to be closely related to *S. chiriquiensis websteri* Pilsbry from Haiti, but it has fewer, less prominently noded ribs.

Locality.—Near Cedral, Dept. of Atlantico.

Age.—Middle - Upper Miocene.

Scapharca chiriquiensis Gabb var. **bolivari** Weisbord, n. var. **Pl. 1, Figs. 4-9**

Shell of medium size, varying considerably in shape. Some of the larger shells are much like *chiriquiensis* lacking, however, the twisted appearance so characteristic of the Santo Domingan species. Some of the smaller shells are longer and high and resemble *Scaphareca websteri* Pilsby. These various forms however appear to intergrade and hence I am considering them as the same species.

Left valve with twenty-nine of thirty square ribs which are closely sculptured with equal transverse nodules. On the posterior slope the ribs are weaker and simple. The right valve has about twenty-eight ribs similarly sculptured. Most of the shells have a tendancy to become slightly depressed behind the middle in front of the posterior truncation and are all well inflated. Cardinal area of moderate width with one to seven resiliary grooves depending upon the amount of developement of the shell. Hinge rather narrow bearing numerous, closely spaced teeth which are smaller medially and larger distally, the marginal ones slightly oblique.

Dimensions: Alt. 39 mm; Long. 43 mm. Adult specimen
Alt. 21 mm; Long. 30 mm.
Alt. 29 mm; Long. 37 mm.

The larger specimens differ from the true *chiriquiensis* in being less depressed behind the middle, less irregularly swollen and with relatively lower beaks. Some specimens closely resemble *S. chiriquiensis websteri* especially those figured by Woodring[10], but the poserior margin is rather uniformly more acutely sloping than on the Haitian form.

Locality.—About 4 kilometers east of Esperanza, Dept. of Bolivar.

Age.—Middle Miocene.

Scapharca pittieri Dall Pl. 1, Figs. 10, 11

Arca (Scapharca) pittieri Dall, Smith. Misc. Coll., Vol. 59, No. 2, P. 9, 1912.
Arca pittieri Olsson, Bull. Amer. Pal., Vol. 9, No. 39, P. 192, Pl. 24, Figs. 2-6, 1922.

Comparison with specimens from Costa Rica show the Colombian shells to be practically identical with *pittiori.* In his original description Dall says ". . . . *anterior* end attenuated and produced but not sharply truncated, *posterior* end much shorter and very bluntly rounded . . . ."; and again, ". . . . hinge line straight, the tooth series divided somewhat in front of the beak with about twenty-two *anterior* and eighteen *posterior,* closely adjacent. slightly wavy, flat teeth." This diagnosis fits our shells except that the anterior and posterior are opposite of that spoken of in the original description. In the original description anterior and posterior should be reversed.

Dimensions: Alt. 22 mm; Long. 23 mm.

The somewhat more elongated outline differentiates this species from *A. hindsii* and *A. lloydi* Olsson. The Venezuelan *A. berjadinensis* Hodson[11] is smaller but closely allied to younger forms of *pittieri.* *Scapharca hispanioliana* Maury[12] from Santo Domingo is superficially quite similar but the amphidetic area in *pittieri* is not partially obscured by the ribbing as in the other.

Locality.—Between Sibarco and Piedras de Afilar, Dept. of Atlantico.

Age.—Miocene.

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[10] Geology of the Republic of Haiti, Pl. 10, Figs. 9-11, 1924.
[11] Bull. Amer. Pal., Vol. 13, No. 49, p. 6, pl. 4, figs. 1-3, 5, 1927.
[12] Ibid, Vol. 5, No. 29, p. 176, pl. 30, figs. 9, 10, 1927.

Distribution.—Costa Rica; Colombia.

Genus GLYCYMERIS Da Costa

Glycymeris lloydsmithi Pilsbry & Brown Pl. 1, Figs. 12, 13

Glycymeris lloydsmithi Pilsbry & Brown, Acad. Nat. Sci. Phil. Proc., Vol. 69, P. 39, Pl. 6, Fig. 6, 1917.

Glycymeris lloydsmithi Olsson, Bull. Amer. Pal., Vol. 9, No. 39, P. 181, Pl. 25, Figs. 8-10, 1922.

Glycymeris lloydsmithi Anderson, Calif. Acad. Sci. Proc., 4th ser., Vol. 16, No. 3, P. 89, 1927.

The shell is slightly inequilateral with somewhat straightened umbonal margins. There are about 27 low, broad, rounded ribs. On our specimens these ribs do not become appreciably weaker ventrally as on the specimen originally described by Pilsbry & Brown. The cardinal area is small and not grooved.

Dimensions: Alt. 37 mm; Long. 35 mm.

This species is distinguished from *G. canalis* by the absence of V-shaped grooves in the cardinal area.

Localities.—Near Usiacuri; near Puerto Colombia; Morro Hermoso, in the Dept. of Atlantico.

Age.—Middle - Upper Miocene.

Distribution.—N. of Urumaco, Falcon, Venezuela; Red Cliff and Middle Creek, Costa Rica; Colombia.

Glycymeris lloydsmithi multicostata Weisbord n. subsp. Pl. 2, figs. 1, 2

Shell of medium size, moderately convex, subcircular in outline. Cardinal area narrow, small and smooth. There are 15 teeth before the beak and 16 behind. The teeth are angularly bent near the beak but are straight marginally and all are vertically striated. The ribs vary from 23 to 27 in number. Umbonally they are simple, strong and convex. Medially the ribs become tripartite, arranged so that the middle part is broader and more elevated than the two sides. Near the base of the shell this broad part of the rib may become split, dividing it into four parts. Within, there are about 18 broad denticles on the margin. Crossing the valve are numerous, regular, fine, growth striae.

Dimensions: Alt. 36 mm; Long. 34 mm.

This species is a more highly developed form of *lloydsmithi* and may prove to represent a more rugged form of that species. It is generally, though not always, more circular in outline, has more teeth in the hinge and has prominent multicostate ribs. *G. democraciana* Hodson is very similar to the species under discussion but differs somewhat in its more irregular shape. The Venezuelan shell is probably a varietal form of *llyodsmithi* rather than *canalis* inasmuch as it lacks the grooves on the cardinal area. Superficially the Colombian form resembles *G. canalis trilobicosta* Pilsbry & Brown but differs in being larger and lacking the grooves on the cardinal area. *Pectunculus gatunensis* described by Toula has somewhat the same surface features but is much smaller and is probably a varietal form of *G. canalis.*

Localities.—Piedras de Afilar; Morro Hermoso, in the Dept. of Atlanaico.

Age.—Miocene.

Glycymeris canalis var. **colombiensis** Weisbord n. var. Pl. 2, figs. 3, 4

Shell rather small, subtriangular, slightly inequilateral. Hingeline short, slightly sloping; cardinal area narrow, sculptured with three or four well incised, angulate, V-shaped grooves. Hinge with 10 to 13 teeth before the beak and 11 to 15 behind. Ventral margin with about 15 to 17 denticles. Ribs low, broad, slightly convex, usually simple but occasionally having a tendency to become tripartite toward the base. The number varies from 24 to 27. Obsolete concentric growth striae cross the valve.

Dimensions: Alt. 24 mm; Long. 22mm.

Differs from the true *canalis* in its more subdued ribbing.

Localities.—Near Pto. Colombia; Piedras de Afilar, in the Dept. of Atlantico.

Age.—Miocene.

Glycymeris cf. **tumefactus** Pilsbry and Brown Pl. 2, fig. 5

Glycymeris tumefactus Pilsbry and Brown, Acad. Nat. Sci. Phil. Proc., Vol. 69, P. 38, Pl. 6, fig. 7, 1917.

A weathered specimen in our collection is seemingly referable to this species, though our shell is slightly more circular in form. There are several small vertical teeth below the beak. These are somewhat larger and angularly bent medially but become smaller and oblique distally. There are about 15 after the beak.

Dimensions: Alt. 42 mm; Long. 44 mm. Approximately.

Differs from *G. jamaicensis, pennaceus* and *carbasina* in lacking the fine radial striae characteristic of the group.

Locality.—Near Tubera, Dept. of Atlantico.

Age.—Miocene.

Superfamily OSTRACEA Goldfuss

Family OSTREIDÆ Lamarck

Genus OSTREA Linnaeus

Ostrea osculum Pilsbury and Brown Pl. 2, figs. 6, 7

Ostrea sculpturata osculum Pilsbry and Brown, Acad. Nat. Sci. Phil., Proc., Vol. 69, P. 40, Pl. 6, Figs. 2, 2a, 1927.

This is quite a variable form. Our shells are thin and have a yellowish tinge. The lower or left valve may be subovate, sickle-shaped or claw-like in outline varying also in the degree of inflation. Valves have two of more folds which vary from wavy undulations to acute angulations. The muscular scars are lightly impressed, pear-shaped, with a narrow tapering end pointed obliquely toward the beak. Resilium small, triangular. Margins pitted for various distances from the beak. Upper valves flat with undulated margins.

Dimensions: Alt. 42 mm; Width 29 mm.

The form figured by Pilsbry and Brown shows two very angulate folds, but they note that some shells are flatter with less emphatic plications. One of our specimens has a strongly angulate margin but there are four or five instead of two folds. The other shells have about two folds but these are gentle.

Locality.—Near Usiacuri, Dept. of Atlantico.

Age.—Miocene.

Ostrea messor colombiensis Weisbord n. subsp. Pl. 2, figs. 8, 9

See Ostrea mesor Maury, Bull. Amer. Pal., Vol. 10, No. 42, P. 81, Pl. 10, Figs. 3, 4, 1925.

The left or lower valve is crescent-shaped with four of five angulate folds on the dorsal margin, three of which are more pronounced than the others. The surface of the valve has three or four weak, interrupted longitudinal folds. Beak curved, pointed. Resilium triangular, of moderate length. On either margin are narrow grooves extending part way down the shell and are pitted. The rest of the margin is simple. Muscular scars not deeply impressed. Upper valve missing.

Dimensions: Long. 53 mm; Width 33 mm.

This is like the foregoing but larger and thicker. It varies somewhat from the typical Trinidad *messor* in the arrangement of the angulations. Formerly this general group of shells was considered identical with the recent Peruvian *megodon* described by Hanley, but as Maury has pointed out Hanley's type has five or six larger folds and several posterior weaker ones. *O. messor caimites* from Santo Domingo is of the same general type as this species but has a thinner shell. *O. messor tabaquita* Maury and *O. megodon* Olsson are forms with occasional exaggerated saddles between the angulations.

Locality.—One-half kilometer west of Piedras de Afilar Dept. of Atlantico.

Age.—Miocene.

Collector.—Mr. C. C. Addison.

Superfamily PECTINACEA Reeve

Family PECTINIDÆ Lamarck

Genus AMUSIUM Bolten

Amusium luna Brown and Pilsbry Pl. 3, Fig. 1

Cf. Amusium Mortoni Böse, Inst. Geol. de Mexico, Boll. No. 22, P. 74, Pl. 1, figs. 3, 6, 7, 9; Pl. 8, Figs. 1, 2, 1906.

Pecten (Amusium) cf. mortoni Toula, Jahr. der K-K Geol. Reich., Vol. 58, P. 714, Pl. 26, Figs. 8, 9, 1908.

Pecten (Amusium) luna Brown and Pilsbry, Acad. Nat. Sci. Phil. Proc., Vol. 64, P. 514, Pl. 23, Fig. 1, 1912.

Amusium luna Olsson, Bull. Amer. Pal., Vol. 9, No. 39, P. 205, Pl. 17, Fig. 1, 1922.

Amusium large species Cooke, U. S. Nat. Mus. Bull. 103, P. 588, 1919.

Altho considerably larger than the Canal Zone shell the Colombian specimen appears to be otherwise very similar. It is much like the East Coast *mortoni* but the latter is a broader form and the ears are separated from the disk by a light line. Unfortunately the interior of the hinge is inaccessible.

Locality.—Near Usiacuri, Dept of Atlantico.

Age.—Middle Miocene.

Distribution.—Canal Zone, Costa Rica, Venezuela and Colombia. The *mortoni* of Böse from Mexico may be referred to this species.

Family SPONDYLIDÆ Fleming

Genus SPONDYLUS Linné

Spondylus colombiensis Weisbord n. sp. Pl. 2, Figs. 10, 11

This species is represented in the collection by a well preserved right valve. Shell rather large, moderately convex, slightly inequilateral. Beak elevated, rather narrow, and twisted. Cardinal area prominent, about 12 mm. in altitude and 35 mm. in length, with a deeply incised, narrow, triangular resilium. Area marked with rather fine vertical striae. Ears subequal, the anterior sculptured with sinuous, transverse growth lines and crossed by radial lines giving the whole an imbricated appearance. The posterior ear only has the transverse striae. The valve is ornamented with seven or eight strong radii rather heavily spined. Between these are secondary smaller ribs, profusely studded with projecting spines, and a third and fourth series of riblets. The smallest are the most abundant and are also closely set with small rectangular nodes. On the other ribs the spines project downward and show a tendancy to be tubular.

Ventral margin well rounded; posteriorly the valve is slightly swollen. Inner margin with elongated denticles; muscular scar large. Interior of the shell chocolate colored.

Dimensions: Alt. 75 mm; Long. 65 mm.

The Colombian shell is closely allied to *S. falconensis* Harris[13] from Venezuela and *S. chiriquiensis* Olsson[14] from Costa Rica. The Venezuelan species has a greater number of larger, subequal secondary radii than the Colombian form has. With the exception of this slight variance in sculpture the two forms are strikingly similar. *S. chiriquensis* is also quite similar in its general characteristics but here again the stronger secondary radii and less spinose character of the tertiary threads serve to differentiate the two forms. The minor ribs on the well known *S. bostrychites* Guppy are less spiny than on *S. colombiensis*.

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[13] Bull. Amer. Pal., Vol. 13, No. 49, P. 40, Pl. 23, Figs. 4, 5, 1927

[14] Ibid, Vol. 9, No. 39, P. 206, Pl. 20, Figs. 1,2 5, 6, 1922.

Locality.—Near Tubera, Dept. of Atlantico.

Age.—Miocene.

Order ANOMALODESMACEA Dall

Superfamily ENSIPHONACEA Dall

Family POROMYACIDÆ Dall

Genus DERMATOMYA Dall

? Dermatomya harrisi n. sp. **Pl. 3, Fig. 2**

Shell large, plump, equivalved, somewhat inequilateral; shell substance rather thin. Anterior end slightly shorter, well rounded in front; posterior end longer, roundly truncate. Umbos large, high and plump. Beaks prosocoelous with a large, cordate, lunular depression in front. There is a slight line extending from the back of the beak part way down the valve. Before this, the valves have a very slight *Metis*-like depression. Valves marked with concentric growth striae which are more prominent near the margins of the valve. Ventral margin well rounded at the ends but nearly straight medially. Interior of the hinge not accessible.

Dimensions: Alt. 43 mm; Long. 52 mm.

The generic determination of this very interesting form is open to doubt. The typical *Dermatomya* has a thin, pearly shell, and those forms that have been described are small and characteristic of deep water. Nevertheless this has much in common with the *Poromyacidae* and until the characters of the hinge are known I am provisionally regarding this as *Dermatomya*[15]. In some of its aspects, however, the shell is like the genus *Thracia*.

This rare form is named in honor of Prof. G. D. Harris of Cornell University.

Locality.—Near Tubera, Dept. of Atlantico.

Age.—Middle Miocene.

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[15] Dall, U. S. Nat. Mus., Bull. 112, P. 27, Pl.3, Fig. 10, 1921

Order TELEODESMACEA Dall

Family CRASSATELLITIDÆ Dall

Genus CRASSATELLITES Kruger

Crassatellites reevei Gabb var. **pleurarostra** n. var. Pl. 3, figs. 3, 4

Crassatellites reevei Olsson, Bull. Amer. Pal., Vol. 9, No. 39, P. 212, Pl. 20, Fig. 4, 1922. Not of Gabb?, Trans. Amer. Phil. Soc., Vol. 15, P. 252, 1873.

In 1873 Gabb collected a form of *Crassatellites* which resembles *antillarum* Reeve but for which he proposed the name *reevei.* Later Brown and Pilsbry[16] rediscribed and figured the Santo Domingan form noting in the description the fact that the concentric sculpture extends without irregularity upon the beak. In Costa Rica Olsson collected several forms which are nearly identical with *reevei* but have larger concentric waves on the beak. Upon comparison with Brown and Pilsbry's figure it appears, further, that the posterior angulation is not quite as deeply deflected as that of the Costa Rican form. For these two reasons the varietal name has been suggested.

The Colombian forms are in every way identical with the Costa Rican species.

Dimensions: Alt. 40 mm; Long. 57 mm.

C. trinitarius Maury[17] is a relatively more elongate form of this same general group. *C. trinitarius venezuelanus* Hodson[18] differs in being more pointed posteriorly altho this is a somewhat variable feature.

Localities.—Near Usiacuri; near Tubera; Morro Hermoso, in the Dept. of Atlantico.

Age.—Middle Miocene.

Distribution.—Colombia, Costa Rica.

Crassatellites aviaguensis ? F. Hodson Pl. 3, Figs. 5, 6

Crassatellites aviaguensis Hodson, Bull. Amer. Pal., Vol. 13, No. 49, P. 45, Pl. 28, Figs. 4, 7, 8, 10, 1927.

A large robust species with a wide hinge, big, deeply sunken lunule and strongly bent shell seems to be identical with the Venezuelan form, our shell is from the Miocene of the coastal Tertiary deposits. The Venezuelan species is reported to be from the Oligocene.

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[16] Acad. Nat. Sci. Phil. Proc., Vol. 64, P. 515, Pl. 23, Fig. 5, 1912.

[17] Bull. Amer. Pal., Vol. 10, No. 42, P. 175, Pl. 31, Figs. 1, 7, 1925.

[18] Ibid, Vol. 13, No. 49, P. 45, Pl. 28, Figs. 2, 6, 9, 1927.

Dimensions: Alt. 50 mm; Long. 65 mm.

The hinge on our form is 13 mm. in width. The lunule and escutcheon are decidedly sloping.

Locality.—Near Usiacuri, Dept. of Atlantico.

Age.—Middle Miocene.

Distribution.—Venezuela (Falcon) and Colombia (Atlantico).

Superfamily CARDITACEA Menke

Family CARDITIDÆ Gill

Genus VENERICARDIA Lamarck

Venericardia dominica new name Pl. 2, Fig. 12, Pl. 3, Figs. 10, 11; Pl. 4, Fig. 1.

Venericardia scabricostata Maury, Bull. Amer. Pal., Vol. 5, No. 29, P. 198, Pl. 33, Fig. 1, 1917. Not of Guppy, Quart. Journ. Geol. Soc. London, Vol. 22, P. 293, Pl. 18, Fig. 10, 1866.

Guppy's inadequate figure and brief description misled Maury in identifying a common Santo Domingan *Venericardia* with *Cardita scabricostata,* a Bowden species. This was later rectified by Woodring[19] who showed that the two species are distinct.

A number of Colombian specimens are practically identical with the Santo Domingan form. The shell is rather solid, subquadrate in outline, somewhat inequilateral, rather well inflated; anterior margin gently rounding into the slightly curved base; posterior margin nearly straight joining the base at an angle of about 65 or 70 degrees. Beaks high, plump. Sculpture consisting of about 18 to 21 high radial ribs bearing numerous equal transverse beads. The ribs are more strongly beaded on the anterior and medial portion of the shell than on the posterior truncation where the ribs are thinner than on the other part of the valve. The ribs are separated by interspaces as wide or wider than themselves. A series of fine thansverse growth striae are seen in the interspaces and are less prominent on the ribs. Hinge normal with the anterior cardinal tooth on the left valve split into two.

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[19] Carn. Inst. Wash. Pub. 366, P. 100, 101, Pl. 12, Figs. 7-9, 1925.

Dimensions: Alt. 23 mm; Long. 23 mm. Adult.

This differs from *Cardita scabricosta* Guppy from the Bowden beds of Jamaica by lacking the terraced ribs. "*Venericardia scabricosta*" Olsson[20] is quite similar but is plumper. *V. zuliana* Hodson[21] and its varieties are smaller forms of this same stock.

Locality.—Near Piedras de Afilar, Dept. of Atlantico.

Age.—Miocene.

Distribution.—Santo Domingo; Colombia.

Venericardia terryi Olsson Pl. 3, Figs. 7-9

Venericardia terryi Olsson, Bull. Amer. Pal., Vol. 9, No. 39, P. 206, Pl. 32, figs. 12, 13.

The Colombian shell is somewhat larger but in other respects identical with the Costa Rican *V. terryi.* It is intermediate in size between *V. terryi* and *V. olssoni* Hodson[22] from Venezuela. *V. terryi* var. *brassica* Maury from the Brasso Miocene of Trinidad differs in being more elongate and in having more ribs.

Dimensions: Alt. 32 mm; Long. 30 mm.

Localities.—Near Tubera; near Usiacuri, in the Dept. of Atlantico.

Age.—Miocene.

Distribution.—Costa Rica; Colombia.

Superfamily CHAMACEA Geinitz

Family CHAMIDÆ Lamarck

Genus CHAMA (Linné) Bruguières

Chama corticosaformis n. sp. Pl. 4, Figs. 2-4

Shell large, thick, solid, lamellose, attached by the right valve. Right valve plump, quadrate in outline, sculptured with irregular lamellae which contain weak radial striae. Beak high, full, prosogyrate; hinge normal, with a prominent serrated tooth; ligamental groove rather long, narrow and deep. Visceral area of the valve smooth, the margin denticulate with numerous subequal striae. These become smaller toward the umbo; adductors rather deeply impressed.

Left valve smaller, flat, subcircular in outline, ornamented with numerous sharp irregular foliae which are adorned with radiating striae. Inner margin also denticulate.

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[20] Bull. Amer. Pal. Vol. 9, P. 388, Pl. 32, Figs. 14, 17, 1922.

[21] Ibid, Vol. 13, No. 49, P. 46, 1927.

[22] Bull. Amer. Pal., Vol. 13, No. 49, P. 49, Pl. 29, Figs. 13, 14, 1927,

Dimensions: Alt. 45 mm; Long. 42 mm. Right valve.
Alt. 37 mm; Long. 38 mm. Left valve.

This species is strikingly similar to the east coast Miocene *C. corticosa* Conrad, but differs in the uniformly greater solidity of the shell. It is also noted that *C. congregatoides* Maury from Santo Domingo is also closely allied to the East Coast *C. congregata* Conrad, making it appear as if the Caribbean Miocene Chamas have Atlantic affinities.

Localities.—Near Pto. Colombia; near Tubera, in the Dept. of Atlantico.

Age.—Miocene.

Distribution.—Colombia; Venezuela (Falcon).

Genus ECHINOCHAMA Fischer

Echinochama antiquata ? Dall Pl. 4, Fig. 5

Chama arcinella Guppy (not Linné), Quart. Journ. Geol. Soc., Vol. 22, P. 294, 1866.
Echinochama antiquata Dall, Wag. Inst. Sci. Trans., Vol. 3, Pt. 6, P. 1404, Pl. 54, Fig. 10, 1903.
Echinochama antiquata Woodring, Carn. Inst. Wash., Pub. 366, P. 106, Pl. 13, Figs. 1-4, 1925.

A broken left valve appears to be very similar to the Bowden species.

Locality.—Near Tubera?, Dept. of Atlantico.

Age.—Miocene.

Distribution.—Bowden series of Jamaica; Falcon, Venezuela; Colombia?.

Superfamily CARDIACEA Lamarck

Family CARDIIDÆ Fischer

Genus CARDIUM Linné

Subgenus CERASTODERMA Morch

Cardium (Cerastoderma) brantlyi n. sp. Pl. 4, Fig. 7

Shell large, well inflated, rather thin, subcircular, with an extended well rounded anterior margin; subtruncate behind. Beak high, full. Sculptured with about 46 low, strong radial ribs, which are flattened near the umbos and a short distance down the valve, separated by slightly narrower square grooves which contain a rather wide, slightly depressed riblet which disappears toward the base. Ventrally the ribs become somewhat broader, more convex and are separated by simple, narrow, V-shaped interspaces. On the posterior fifth of the valve the ribs become nearly obsolete but can be seen if the outer layer of shell is worn. A series of light, shingle-like, concentric lamellae cross the whole. The ventral margin is broken.

Dimensions: Alt. 85 mm; Long. 77 mm; aproximately when whole.

This recalls the large *C. robustum* Solander in a general way but differs in having more numerous ribs and in being broader.

It is a pleasure to name this large rare species in honor of Mr. J. E. Brantly chief geologist of the Atlantic Refining Company.

Locality.— Morro Hermoso.

Age.—Miocene.

Subgenus LÆVICARDIUM Swainson

Cardium (Lævicardium) serratum Linnaeus Pl. 4, Fig. 6

Cardium serratum Linnaeus, Syst. Nat., Ed. 10, P. 680, 1758
Cardium (Lævicardium) serratum Dall, Wag. Inst. Sci. Trans., Vol. 3, Pt. 5, P. 1110, 1900.
Cardium (Lævicardium) serratum Brown and Pilsbry, Acad. Nat. Sci. Phil. Proc., Vol. 63, P. 367, 1911.
Cardium (Lævicardium) serratum Maury, Bull. Amer. Pal., Vol. 5, No. 29, P. 212, Pl. 36, Fig. 8, 1917.
Cardium cerratum Olsson, Ibid, Vol. 9, No. 39, P. 228, Pl. 27, Figs. 11, 12, 1922.
Cardium (Lævicardium) serratum Maury, Ibid, Vol. 10, No. 42, P. 138 Pl. 23, Fig. 14, 1925.
Cardium (Lævicardium) serratum Woodring, Carn. Inst. Wash. Publ. 366, P. 145, Pl. 19, Figs. 14 - 16, 1925.

A number of *Laevicardia* closely resemble the well known *serratum*. The Colombian form is characterized by a rather sharp posterior truncation and oblique form. This species varies considerably in obliquity, tumidity and clearness of radiating sculpture. Examination of a *Laevicardium* from Gatun which was called *Cardium* (*Levicardium*) *dalli* by Toula[23] shows no wide divergence from *serratum* and should perhaps properly be considered the same.

Locality.—Near Usiacuri, Dept. Atlantico.

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[23] Jahr. K-K Geol. Reich., Vol. 58, P. 722, Pl. 27, Fig. 6, 1908. Not of Heilprim, Trans. Wag. Inst. Sdi., Vol. 1, P. 131, Pl. 16a, Fig. 70, 1887.

Age.—Miocene.

Distribution.—Jamaica, Costa Rica, Canal Zone, Venezuela,
Colombia, Trinidad, Florida, South Carolina.

Range.—Miocene.—Recent.

Dimensions: Alt. 43 mm: Long. 36 mm.

Superfamily VENERACEA Menke

Family VENERIDÆ Leach

Genus ANTIGONA Schumacher

Section DOSINA Gray

Antigona (Dosina) caribbeana Anderson Pl. 4, Fig. 12

Antigona multicosta Olsson (Not Sowerby), Bull. Amer. Pal., Vol. 9, No. 39, P. 239, Pl. 30, Fig. 1, 1922.

Antigona caribbeana Anderson, Cal. Acad. Sci. Proc., Vol. 16, No. 3, 4th ser., P. 90, Pls. 2, 3, 1927.

Antigona (Dosina) dominica Palmer, Paleont. Amer., Vol. 1, No. 5, P. 127, Pl. 29, Figs. 4, 7; Pl. 31, Fig. 15, 1927.

This species was first figured by Olsson who referred it to *multicostata* of Sowerby. Rather recently, however, Palmer recognized that the form is specifically distinct from that described by Sowerby and renamed it *dominica.* While her paper on the *Veneridae* was in press, Anderson *op. cit.*, described and figured a large species from Colombia which he named *caribbeana.* This seems to be identical with *dominica* but inasmuch as Anderson's notification was published first, the name *dominica* is relegated to synonymy.

Our specimen tho considerably weathered is identifiable as *caribbeana.* It is characterized by its large size, square topped concentric ribs, and finely crenulated inner margin. *Antigona multicostata* Sowerby differs from the present species in having narrower and more rounded concentric costae.

Dimensions: Alt. 145 mm; Long. 125 mm.

Locality.—Usiacuri; Dept. of Atlantico, Colombia

Age.—Middle Upper Miocene.

Distribution.—Colombia—Usiacuri; Tubera.
Venezuela—La Vela? State of Falcon.
Costa Rica—Water Cay.
Santo Domingo—Rio Gurabo.

Genus CHIONE Megerle

Subgenus CHIONE Megerle

Chione (Chione) bolivarensis n. sp. Pl. 5, Figs. 2, 3

Shell of medium size, trigonally ovate in outline, considerably inflated or swollen. Beaks low, fairly prominent. Lunule slightly depressed, bounded by a rather deep groove and sculptured with about four prominent radiating riblets. Escutcheon broad. Posterior margin slightly convex or humped. Base arcuate. Somewhat behind the center of the valve is a very shallow but broad sulcus. Sculpture consisting of a number of concentric, lamellae which are inclined toward the umbos. These are separated by rather wide interspaces, in which, and on the ventral sides of the concentric lamellae are closely spaced, equal strong radii. On the anterior portion of the valve are three or four low, strong longitudinal ridges conforming with the natural curve of the shell extending from the anterior portion of the beak to near the base of the shell. Inner margin denticulate.

Dimensions: Alt. 20 mm; Long. 23 mm.

The main features are its strong inflation, posterior sulcus and longitudinally ribbed lunule. It superficially resembles the Venezuelan Miocene *C. paraguanensis* Hodson but differs in its stronger inflation, fewer concentric lamellae and ribbed lunule. From *C. sawkinsi* Woodring[24] it is distinguished by its broader escutcheon.

Locality.—Jesus del Monte, Dept. Bolivar.

Age.—Lower Middle Miocene.

Subgenus LIROPHORA Conrad

Chione (Lirophora) latilirata colombiana n. subsp. Pl. 4, Figs. 8 - 10

Shell rather large when adult, moderately inflated, thick, solid, rounded-trigonal in outline. Anterior margin bordering the lunule, very concave. Posterior margin nearly straight, base bounded by a slightly incised line; escutcheon rather broad. evenly arcuate. Lunule rather large, cordate, depressed, Sculpture in general resembling the *latilirata* type with a number of thickened, broad, semi-flattened ribs extending from the lunule to the escutcheon. There is no tendency for the ribs to play out posteriorly. The broader ribs are near the base of the shell gradually decreasing in size upward. Below the beak some specimens show a rib which is somewhat thicker than the immediate ones above and the first or first two below. Inner margin finely denticulate.

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[24] Carn. Inst. Wash. Pub. 366, P. 159, Pl. 21, Figs. 12-14, 1925.

Dimensions: Alt. 30 mm; Long. 36 mm. (Adult)

This species is of the same general type as the East Coast forms of *latilirata* which exhibit startling variations in the character and number of the ribs. *C. cartagenensis*[25] and *C. matarucana*[26] both described by H. K. Hodson are very similar species the former differing by having the ribs thin out near the escutcheon and being broader above than below, the latter differing in its less concave anterior margin bordering the lunule.

The distinguishing characters of this form are the persistant, regularly curved ribs which are generally broadest near the base, and the highly concave anterior margin.

Localities.—One half a kilometer W. of Piedras de Afilar; Morro Hermoso, Dept. Atlantico.

Age.—Miocene.

Collector.—Mr. C. C. Addison.

Chione (Lirophora) usiacurina n. sp. **Pl. 4, Fig. 11**

Shell of medium size, moderately convex medially, somewhat longer than high, with low, appressed beaks; lunule large, slightly sunken, bounded by a lightly impressed line which instead of being nicely curved is nearly straight centrally. Posterior margin slightly humped, base arcuate. The valve is sculptured with about 16 rather uneven, flexuous, rounded ribs which extend from near the border of the lunule to an area near the escutcheon where they flatten out. Escutcheon prominent, inclined. On the posterior fifth of the shell is a light longitudinal sulcus.

Dimensions: Alt. 23 mm; Long 28 mm.

The shell shows no radial sculpture on the surface. Its more characteristic features are the large lunule shaped somewhat like the hull of a ship, the flexuous ribs and the slightly humped posterior margin.

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[25] Bull. Amer. Pal., Vol. 13, No. 49, P. 63, Pl. 31, Fig. 4; Pl. 35, Fig. 6, 1927.

[26] Ibid, P. 64, Pl. 35, Fig. 4, 1927.

Locality.—Near Usiacuri, Dept. of Atlantico.

Age.—Miocene.

Genus CLEMENTIA Gray

Clementia dariena dariena Conrad Pl. 5, Fig. 1

Meretrix dariena Conrad, U. S. Pac. R. R. Expl. Vol. 5, Pt. 2, P. 328, Pl 6, Fig. 55, 1855.

Clementia (Clementia) dariena dariena Woodring, U. S. G. S. Prof. Paper 147 - C, P. 34, Pl. 14, Figs. 6 - 11, 1926.

A complete discussion including synonymy and distribution of this well known species is ably given by Woodring.

Dimensions: Alt. 60 mm; Long. 55 mm.

Localities.—10 kil. W. of Usiacuri; 1 kil. E. of Usiacuri, Dept. of Atlantico.

Superfamily TELLINACEA Blainville

Family TELLINIDÆ Deshayes

Genus METIS H. & A. Adams

Metis trinitaria colombiensis n. subsp. Pl. 5, Fig. 6

Shell oval-oblong, anterior end rounded, posterior end slightly longer or of equal length. Right valve with a broad sulcus extending from the umbo in a slightly oblique line to the base of the shell gradually expanding ventrally. This is bounded posteriorly by a well defined ridge with a faint suggestion of a fainter one in front. Surface sculptured with numerous, fine, slightly elevated, concentric lines. Beaks situated at or near the center. Left valve with a gradually expanding ridge behind the beak.

Dimensions: Alt. 46 mm; Long. 60 mm.

This is very similar to *M. trinitaria*[27] Dall. The Colombian shell, however, seems to differ in having the bèaks located centrally, making the anterior and posterior parts of the shell nearly equal in length. On the Trinidad form the anterior end is somewhat produced.

Locality.—Near Usiacuri, Dept. of Atlantico.

Age.—Miocene.

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[27] Wag. Inst. Sci. Trans., Vol. 3, Pt. 5, P. 1041, Pl. 46, Fig. 24, 1900.

Family PSAMMOBIIDÆ Dall

Genus ASAPHIS Modeer

Asaphis delicatus (Weisbord) Pl. 5, Figs. 4, 5

Asaphis delicatus Weisbord, Pal Venezuela, P. 210, Pl. 17, Fig. 14, 1924. (MS)

A poorly preserved specimen from Colombia seems to be identical with *Asaphis delicatus* first described from Venezuela

For the sake of clarity the following description is taken from the Venezuelan specimen which is in a good state of preservation.

Shell large, thin, ovate, moderately convex, produced behind with a slightly truncated posterior dorsal area; base nearly straight; umbos conspicuous, quite convex, with prominent subacute beaks situated on the anterior third of the shell. Sculpture consisting of a series of delicate, wavy, radii with one or more finer threads between. In addition there are fine concentric lines and concentric undulations. These are more prominent near the margins of the valve. Interior inaccessible.

Dimensions: Venezuelan shell — Alt. 42 mm; Long. 59 mm.
Colombian shell — Alt. 42 mm; Approx. Long. 56 mm.

This species recalls *A. centenaris* Conrad from the East Coast Miocene, but the latter is more coarsely sculptured radially, and also has numerous concentric incremental lines transversing the whole, giving a more rugged appearance to the shell. Nevertheless the relationship between the two species is rather marked.

Localities.—N. of Urumaco, Falcon, Venezuela.
Near Usiacuri, Atlantico, Colombia.

Age.—Middle Miocene.

Superfamily MYACEA Menke

Family CORBULIDÆ Fleming

Genus CORBULA Lamarck

Subgenus CUNEOCORBULA Cossmann

Corbula (Cuneocorbula) hexacyma Brown and Pilsbry Pl. 5, Figs. 7 - 9

Corbula (Cuneocorbula) hexacyma Brown and Pilsbry, Acad. Nat. Sci. Phil. Proc., Vol. 64, P. 518, Pl. 26, Fig. 4, 1912.

Corbula hexacyma Olsson, Bull. Amer. Pal., Vol. 9, No. 39, P. 269, Pl. 21, Figs. 12, 13, 1922.

The species is characterized by its solidity and wave-like concentric ribs. In addition there are fine, hair-like, radial threads which may be observed on perfect specimens.

Dimensions: Alt. 13 mm; Long. 18 mm.

On the majority of the Colombian specimens the radial striae are obsolete. *C. guaiconensis* Maury from the Machapoorie of Trinidad is a smaller form of the same type.

Locality.—E. of Esperanza, Dept. of Bolivar.

Age.—Middle Miocene.

Class SCAPHOPODA Bronn

Family DENTALIIDÆ Gray

Genus DENTALIUM Linné

Dentalium (Fissidentalum ?) solidissimum Pilsbry and Brown, Pl. 5, Figs. 10, 11

Dentalium solidissimum Pilsbry and Brown, Acad. Nat. Sci. Phil. Proc., Vol. 69, P. 37, Pl. 5, Fig. 8, 1917.

This species attains a large size. The shell is slowly tapering, slightly curved and almost circular in section at the smaller and larger ends. Near, but not quite at the tip, there are about 10 or 11 thin, elevated, longitudinal ribs separated by much wider interspaces. By intercalation, this number shortly increases to about 28. For a distance of about three centimeters from the tip, the longitudinal ribs are elevated, rounded and separateed by at first wider, then equal and finally much narrower interspaces. In addition the shell is covered by a series of rather prominent, equal, revolving striae, which become obsolete near the larger portion of the tube. Finally the ribs become subequal, low, broad, very slightly rounded and separated by narrow, shallow grooves. Occasionally there is one, or a few interstitial, irregularly sized ribs. The revolving striae have disappeared. The shell is very thick, being somewhat over two milimeters near the larger end.

Dimensions: Approximate total length 150 mm;
Width at smaller end ...... 1½ mm.
Width at larger end ...... 14 mm.

This species is characterized by its thick shell, circular cross section and in addition to the regular series of longitudinal ribs, the secondary sculpture of revolving striae. It closely resembles *D. rimosum* Böse[28] from the Isthmus of Tehuantepec, Mexico, but comparison with a specimen of the latter shows it to have longitudinally bifurcated ribs. This feature is not present on the Colombian forms.

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[28] Inst. Geo. de Mexico, Vol. 22, P. 55, Pl. 3, Fig. 1, 1906.

Localities.—Near Tubera; near Pto. Colombia, Dept. of Atlantico.

Age.—Miocene.

Collector.—Mr. C. C. Addison.

Class GASTROPODA Cuvier

Order CTENOBRANCHIATA Schweigger

Superfamily PTENOGLOSSA Gray

Family SOLARIIDÆ Chenu.

Genus ARCHITECTONICA Bolten

Architectonica granulatum (Lamarck) Pl. 9, Fig. 15

Solarium granulatum Lamarck, An. sans. Vert., Vol. 7, P. 3, 1792. Ency. Method, Pl. 446, Figs. 5a, b, 1792.
Solarium granulatum Dall, Wag. Inst. Sci. Trans., Vol. 3, P. 329, 1892.
Solarium Villarelloi Bose, Inst. Geol. Mexico, No. 22, P. 30, Pl. 3, Figs. 4 - 11, 1906
Solarium gratunense Toula, Jahr. K-K Geol. Reich., Vol. 58, P. 692, Pl. 25, Fig. 3, 1908.
Solarium granulatum Maury, Bull. Amer. Pal., Vol. 5, No. 29, P. 131, Pl. 23, Fig. 3, 1917.
Architectonica Gratunensis Cooke, U. S. Nat. Mus. Bull. 103, P. 588, 1919.
Architectonica granulata Olsson, Bull. Amer. Pal., Vol. 9, No. 39, P. 154, Pl. 13, Figs. 10 - 12, 1922.
Architectonica granulata Maury, **Ibid**, Vol. 10, No. 42, P. 236, Pl. 40, Fig. 1, 1925.
Architectonica gratunensis Anderson, Calif. Acad. Sci. Proc., Vol. 16, No. 3, P. 89, 1927.
Architectonica granulata Hodson and Harris, Bull. Amer. Pal., Vol. 13, No. 49, P. 66, Pl. 36, Fig. 7, 1927.

Comparison with the recent *granulatum* shows the fossil form to be practically identical. The width and granulation of the spiral cords vary on different specimens. *A. villarelloi* Böse from the Miocene of Mexico and *A. gatunensis* Toula from the Canal Zone appear to be synonymous forms. *A. quadriseriata* Sowerby is a finely beaded species of the same type. This has a wide areal extent.

Dimensions: Width 20 mm; Alt. 14 mm.
Width 40 mm; Alt. 22 mm.

Localities.—Near Usiacuri, Dept. of Atlantico; E. of Esperanza, Dept. of Bolivar.

Age.—Lower Middle - Middle Miocene in Colombia.

Distribution.—Lower and Upper Miocene of the East Coast; Miocene of San Domingo, Canal Zone, Costa Rica, Venezuela, Colombia, Trinidad; recent in the Antilles.

Range.— Lower Miocene to Recent.

Superfamily TÆNIOGLOSSA Bouvier

Family NATICIDÆ Forbes

Genus NATICA Scopoli

Natica canrena (Linné) Morch Pl. 9, Fig. 13

Natica canrena (Linné, **partim**) Moerch, Malak, Blatt. 24, P. 62, 1877
Natica canrena Dall, Wag. Inst. Sci. Trans., Vol. 3, P. 364, 1892
Natica canrena Brown and Pilsbry, Acad. Nat. Sci. Phil. Proc., Vol. 64, P. 508, 1912.
Natica canrena Maury, Bull. Amer. Pal., Vol. 5, P. 298, Pl. 49, Fig. 10, 1917.
Natica canrena Olsson, **Ibid.** Vol. 9, P. 327, Pl. 16, Fig. 9, 1922.
Natica canrena Maury, **Ibid.** Vol. 10, P. 390, Pl. 40, Fig. 8, 1925.
Natica canrina Hodson and Harris, **Ibid.** Vol. 13, No. 49, P. 68, 1927.

This species is characterized by its deep notch, excavated umbilical callus, and strong, tangential sutural plicae. It is a widespread form geographically and ranges from Oligocene to recent.

Dimensions: Alt. 25 mm; Width 22 mm.

Locality.—Between Sibarco and Piedras de Afilar; Morro Hermoso, Dept. Atlantico.

Distribution.—Miocene of the East Coast, Canal Zone, Costa Rica, Jamaica, Trinidad, Venezuela, Colombia, living in the Antilles as far south as Pernambuco.

Natica cuspidata Guppy Pl. 9, Fig. 14

Natica cuspidata Guppy, Agr. Soc. Trinidad and Tobago, Paper No. 454, P. 5, Pl. 2, Fig. 4, 1910. Harris reprint, Bull. Amer. Pal. No. 35, P. 162, Pl. 8, Fig. 4, 1921.
Natica cuspidata Maury, Bull. Amer. Pal., Vol. 10, No. 42, P. 239, Pl. 40, Figs. 9, 10, 1925.
Natica cuspidata Anderson. Calif., Acad. Sci. Proc., Vol. 16, No. 3, P. 89, 1927.

A large sigaretiform Natica is probably equivalent to the Trinidad Miocene *cuspidata* described by Guppy. Our shell is identical with the specimen figured under number nine in Dr. Maury's contribution to the Miocene of Trinidad (see above).

Dimensions: Alt. 35 mm; Width 56 mm.

The Venezuelan analogue is the robust *N. subporcana* (Williston) Hodson[31]. Flattened specimens of the latter are nearly identical with the present species.

Locality.—Near Usiacuri; near Tuberá (Anderson), Dept. of Atlantico.

Age.—Miocene.

Distribution.—Trinidad—Springvale Miocene; Colombia.

Genus POLINICES Montfort

Polinices (Mammilla) cf. brunnea Linck Pl. 9, Fig. 12

Mammilla brunnea Linck, Beschr. Rostock Samm., P. 140, 1807.
Natica mammillaris Lamarck, An. sans. Vert., Vol. 6, P. 197, 1822.
Natica mammillaris Tryon, Manual, P. 43, Pl. 18, Fig. 74, 1886.
Polinices brunnea Dall, U. S. Nat. Mus. Bull. 37, P. 156, 1889.
Polinices mammillaris Pilsbry and Brown, Acad. Nat. Sci. Phil., Vol. 69, P. 34, 1917.
Polinices (Mammilla) brunnea Maury, Bull. Amer. Pal., Vol. 9, P. 150, 1922,

A number of rather large weathered forms are very closely allied if not identical with the recent *P. brunnea* commonly known as *P. mammillaris*. The shell is ovate with about five evenly convex whorls separated by lightly defined sutures. Spire mamillate. Body whorl very slightly flattened near the suture, well rounded below. Aperture ovate. Inner lip grooved horizontally just above the umbilicus.

Dimensions: Alt. 35 mm; Width 29 mm.

This at once recalls the Miocene *P. subclausa* Sowerby but differs in being larger and relatively broader. It is also closely akin to the Venezuelan *P. subclausa lavelena* Hodson[31] but none of our specimens show the deep notch adjacent to the umbilicus. In other respects however the two forms are very similar.

Localities.—Near Tuberá; near Puerto Colombia, Dept. of Atlantico.

Age.—Miocene.

Distribution.—Miocene of Colombia; recent from Florida Keys to Trinidad.

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[31] Bull. Amer. Pal., Vol. 13, No. 49, P. 69, Fig. 8; Pl. 37, Figs. 12, 14, 1927

Family TURRITELLIDÆ Gray

Genus TURRITELLA Lamarck

Turritella cartagenensis Brown and Pilsbry Pl. 9, Figs. 1, 2

Turritella cartagenensis Brown and Pilsbry, Acad. Nat. Sci. Phil., Vol. 69, P. 34, Pl. 5, Fig. 13, 1917.
Turritella cartagenensis Hodson, Bull. Amer. Pal., No. 45, P. 49, 1927.

This species attains a large size. The earlier whorls are flat-sided or slightly convex and ruled with unequal, low but strong striae. The later whorls are somewhat concave with a slight swelling on some specimens above and below the well incised suture. The base is also ornamented with revolving striae but the number and character vary. Only occasionally have I seen specimens which show "four very low, wide spiral welts" as described by Brown and Pilsbry. Sometimes the base has subequal threads, sometimes unequal threads, and occasionally larger and smaller threads interspaced.

Dimensions: Alt. 70 mm; Width 22 mm; (Six and a half basal whorls).

In the Miocene series of Venezuela there is a very similar form to this which Hodson has called *T. bifastigata* var. *democraciana* and *maracaibensis*. The whorls on *democraciana* are separated by gaping sutures, while the whorls on the latter have very pronounced but compressed swellings on both sides of the suture. The typical *T. bifastigata* Nelson from Peru is also rather closely allied but differs substantially in having coarse strong revolving cords on the base of the shell.

Localities.—Near Usiacuri; near Tuberá, Dept. of Atlantico; near Cartagena, Dept. of Bolivar.

Age.—Miocene.

Turritella supraconcava Hanna and Israelsky var. **fredeai** Hodson Pl. 9, Figs. 3, 4

Turritella robusta Grzybowski fredeai Hodson, Bull. Amer. Pal., Vol. 11, No. 42 P. 183, Pl. 5, Figs. 1, 3 etc., 1927.
Turritella abrupta Anderson, Cal. Acad. Sci. Proc., Vol. 16, No. 3, P. 89, 1927

Both this and the Venezuelan shell are closely allied to the Peruvian *T. robusta* Grzybowski. Inasmuch as the name *robusta* is preoccupied the name was changed to *supraconcava* by Hanna and Israelsky[32]. The Colombian species differs from the true

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[32] Calif. Acad. Sci. Proc., 4th ser., Vol. 14, P. 59, 1925.

supraconcava by having fewer revolving threads above the sharp keel.

Dimensions: Alt. 55 mm; Width 21 mm; Six and a half whorls.

The Colombian species at times varies slightly in some of the sculptured details from the Venezuelan species but inasmuch as there is a tendancy for variation among the Colombian specimens themselves I have deemed it advisable not to consider it as a variety. *Turritella bosei* Hertlein & E. K. Jordan[33] from Lower California is of the same general type.

Localities.—Near Usiacuri, Dept. of Atlantico; E. of Esperanza, Dept. Bolivar.

Age.—Miocene.

Distribution.—Colombia; Venezuela; Panama.

Turritella cf. **falconensis** (Williston) Hodson Pl. 9, Fig. 10

Turritella falconensis Williston, Pal. Falcon, Pl. 1, Figs. 10-12, 1923, (MS).
Turritella falconensis Weisbord, Pal. Venezuela, P. 271, Pl. 3, Fig. 8, 1924, (MS).
Turritella gilbertharrisi falconensis Hodson, Bull. Amer. Pal., Vol. 11, No. 45, P. 19, Pl. 14, Figs. 2, 6, 8, etc., 1927.

A number of broken and weathered specimens have the following characteristics. Shell probably of large size when adult, moderately tapering. The whorls which are separated by barely discernible sutures are composed of four major, obliquely beaded spiral cords, the bottommost of which is slightly more protuberant than the others; this is just above the suture and is obsoletely ornamented with fine spiral threads and very faint beads; above this are three subequally spaced cords of which the middle is the weakest, the ones above and below of equal prominence. These three are somewhat more prominently beaded than the lowermost cord. Above the uppermost cord is another revolving line just slightly stronger than the series of fine threads that appear between the major ones. On larger whorls there are two of these.

Dimensions: Alt. 25 mm; Width 15 mm; four middle whorls.

The arrangement of the ribbing is practically identical to that of the Venezuelan specimens, but they are not quite as rugged. This, however, I believe may be due to weathering and for this reason I am provisionally considering the Venezuelan and Colombian forms identical. The Venezuelan shell is a long, robust species with sharply corded whorls. The upper whorls however are less prominently sculptured and in this respect are similar to those on the Colombian specimens.

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[33] Ibid, Vol. 16, No. 19, P. 634, Pl. 21, Figs. 1, 2, 1927.

Localities.—E. of Esperanza, Dept. of Bolivar.

Age.—Lower Middle Miocene.

Distribution.—Venezuela—States of Lara, Zulia and Falcon; Colombia.

Turritella vistana colombiana n. subsp. Pl. 8, Fig. 14; Pl. 9, Fig. 11

Shell very long, gradually tapering; whorls numerous, ornamented with two very high, single, beaded spiral ribs; on the later whorls the elevated cord on the upper fourth of the whorl is slightly thicker and somewhat more protruding than the lower, and is sculptured with oblique nodes, the nodes on the latter being weaker, and oriented oppositely to those of the one above. In the deep, wide, concave interval between the ribs are several, fine, slightly beaded striae occasionally overrun by sinuous growth marks. The portion of the whorl below the lower primary rib is slightly concave and somewhat protrudes over the narrow, incised suture.

Dimensions: Alt. 57 mm; Width 10 mm; (Upper 11 whorls).

This is very similar to *T. vistana* Hodson from Venezuela and similar forms of the *altilira* group. It differs from *vistana* in constantly having more numerous and finer secondary revolving threads. Otherwise the two forms are identical. The same holds true for *T. altilira* var. *urumacoensis* also from Venezuela. *T. altilira* var. *nicholsi* differs from the present species in having more elevated ribs which are frequently bent.

Localities.—Near Tubera; Puerto Colombia; Morro Hermoso, in the Dept. of Atlantico.

Age.—Miocene.

Turritella altilira Conrad var. **atlanticensis** n. var. Pl. 9, fig. 9

This *Turritella* is locally very abundant. The shell is long, slender, and gently tapering. The earlier whorls have two elevated, rounded cords on the lower and upper quarter separated by a shallow, concave interspace with two secondary striae. On later whorls, the elevated cords become pronounced, and the upper is frequently but not always slightly thicker than the lower. Just below the edge of the upper whorl there is frequently a rather strong, beaded secondary thread followed by two or sometimes three unequal threads in the interspace. Sometimes the uppermost secondary cord is the strongest, but more rarely the uppermost and lowermost secondary threads are of equal strength with a weaker thread in between. Below the lower primary rib the whorl is sharply concave and somewhat overhangs the incised suture. The primary ribs are sculptured with fine revolving striae and slender, oblique nodes.

Dimensions: Alt. 35 mm; Width 10 mm; 7 middle whorls

This species differs from the foregoing in the character of the interstitial threads. On *T. vistana colombiana* the secondary threads are finer and more numerous, and it does not have the upper primary cord bordered by a rather strong secondary one. From the typical *altilira* this species may be differentiated by its more recessive and weaker secondary cord adjacent to the primary. It is close to *T. altilira urumacoensis* Hodson[34] from Venezuela but the whorls of this species more prominently overhang the suture and differ somewhat in the details of the secondary sculpture.

Locality.—Between Las Perdices and Pto. Colombia, Dept. of Atlantico.

Age.—Miocene

Turritella cf. gatunensis Conrad **Pl. 9, Fig. 7**

Turritella gatunensis Conrad, Pac. R. R. Rep., VI, P. 72, Pl. 5, Fig. 20.
Turritella conradi Toula, Jahr. K-K Geol. Reich., Vol. 58, P. 694, Pl. 25, Fig. 4, 1908
Turritella gatunensis Brown and Pilsbry, Acad. Nat. Sci. Phil. Proc., Vol. 63, P. 358, Pl. 27, Figs. 4, 5, 9, 1911.
Turritella gatunensis Olsson, Bull. Amer. Pal., Vol. 9, No. 39, P. 143, Pl. 14, Figs. 12, 13, 1922.
Turritella gatunensis Maury, Ibid. Vol. 10, No. 42, P. 229, Pl. 42, Fig. 12, 1925.

A few fragmentary, weathered specimens are seemingly identical with figures and occasional specimens from the Canal Zone. The Colombian specimens are nearly identical to the varietal Venezuelan form *lavelana*[35] but inasmuch as there is some variation in the sculptural details of the typical *gatunensis* from the vicinity of the type locality, I consider such slight variations as natural mutations of the same species.

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[34] Bull. Amer. Pal., Vol. 11, No. 45, P. 44, Pl. 26, Figs. 4, 7, etc., 1927.
[35] Hodson, Bull. Amer. Pal., Vol. 11, No. 45, P. 23, Pl. 18, Fig. 6; Pl. 19, Fig. 7, 1926.

Dimensions: Alt. 22 mm; Width 11 mm; 3½ lower whorls.

Localities.—E. of Esperanza, Dept. of Bolivar.

Age.—Miocene.

Distribution.—Colombia—Dept. Bolivar.
Venezuela—State of Falcon.
Panama—Canal Zone; Water Cay.
Costa Rica—Boucary Creek.
Trinidad—Brasso Creek.

Turritella cf. gatunensis taratarana Hodson **Pl. 9, Fig. 8.**

Turritella gatunensis Conrad taratarana Hodson, Bull. Amer. Pal., Vol. 11, No. 45, P. 25, Pl. 18, Figs. 5, 7, 1926.

A few of the broken Colombian specimens are identical with Hodson's specimen, figure 7. Some of the others vary slightly in the arrangement of the spiral threads but all the forms are of the same stock.

The species is characterized by the excavated sutural zones, and profusely threaded whorls. The whorls are slightly concave medially; below they are rounded, and above they are flat and tapering. The base of the upper whorl protrudes beyond the upper part of the succeeding whorl. The shell is sculptured with subequal and unequal revolving threads which are often scalloped or beaded. This is generally confined to the larger threads of which there are three on a whorl. The basal one comes just above the base of the whorl and this is somewhat stronger than the upper pair at the top of the whorl. Of these, the uppermost may be slightly weaker and may form a slight keel. Minor threads are dispersed throughout.

Dimensions: Alt. 19 mm; Width 9 mm; 3 lower whorls.

Locality.—Between Las Perdices and Pto. Colombea, Dept. of Atlantico.

Age.—Miocene.

Turritella lloydsmithi Pilsbry and Brown **Pl. 9, Figs. 5, 6.**

Turritella lloydsmithi Pilsbry and Brown Acad. Nat. Sci. Phil. Proc., Vol. 63, P. 35, Pl. 5, Fig. 11, 1917.

The earlier whorls are of the *planigirata* type with a medial, rather thick carina. Below this the whorl is slightly concave with a prominent revolving cord between the carina and the suture. The upper part of the whorl is flat or slightly convex, tapering, and sculptured with two subequal striae. Starting with the fifth or sixth whorl, the medial keel becomes sharper-edged but not quite as prominent; the concavity below becomes somewhat more pronounced with a medial cord which is slightly stronger than the finer threads above and below. At the base of the whorl just above the narrowly incised suture there is a thickened, somewhat protuberant rib with a few obsolete revolving striae on it. The upper part of the whorl has numerous, rather unequal revolving threads with a somewhat stronger one medially. As growth progresses, the whorl becomes more uniform and is sculptured with five to seven prominent, rounded ribs the basal one of which is larger than the others. The lower ribs are stronger than the more closely spaced upper ones. Over all there are finer subequal revolving threads.

Approaching the base, the whorl projects beyond the upper part of the succeeding lower whorl. The base is convex with about six strong revolving cords and smaller secondary striae.

Dimensions: Alt. 30 mm; Width 12 mm; Upper 12 whorls.
Alt. 42 mm; Width 21 mm; Lower 3 whorls.

This species differs from *T. planigyrata* Guppy from Trinidad in having more prominent revolving cords and in having a stronger shell. *T. trinitaria* Maury also from Trinidad is very similar but its whorls are more convex, and have more irregular spiral cords with obsolete secondary threads. The group of forms listed under *berjadinensis*[36] from Venezuela are of the same stock but differ in sculptured details. *T. Mimetes* Brown and Pilsbry[37] is quite similar but differs in sculptural details.

Localities.— Near Usiacuri; near Tuberá; Piedras de Afilar, Dept. Atlantico.

Age.—Middle Miocene.

Distribution.—Depts. Atlantico, Bolivar.

Family VERMETIDÆ Adams

Genus SERPULORBIS Sassi

Serpulorbis papulosus? Guppy Pl. 8, Fig. 13.

Vermetus papulosa Guppy, **Ibid**, Vol. 32, P. 519, 1876.
Fig. 3, 1866.
Vermetus papulosa Guppy, **Ibid**, Vol. 32, P. 519, 1876.

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[36] Hodson, Bull. Amer. Pal., Vol. 11, No. 45, P. 26, Pl. 19 etc., 1927.

[37] Acad. Nat. Sci. Phil. Proc., Vol. 63, P. 357, Pl.27, Fig. 1.

Serpulorbis papulosa Maury, Bull. Amer. Pal., Vol. 5, P. 291, Pl. 22, Fig. 10, 1917.
Serpulorbis papulosa Olsson, **Ibid**, Vol. 9, No. 39, P. 145, Pl. 12, Fig. 1, 1922.
Serpulorbis papulosa Anderson, Calif. Acad. Nat. Sci. Proc., 4th ser., Vol. 16, No. 3, P. 89, 1927.

Several fragments are probably referable to this species. On the larger specimen, which is considerably weathered are a series of obtuse nodes and slight transverse swellings and constrictions. The finer sculpture has been removed. On the smaller specimen there is a series of longitudinal nodose ribs interlined with three or four subequal crenate striae.

Localities.—Between Las Perdices and Pto. Colombia; near Tubera, Dept. of Atlantico.

Age.—Miocene.

Distribution.—Jamaica—Bowden series.
Santo Domingo—Gurabo series.
Costa Rica—Gatun stage.

Genus PETALOCONCHUS H. C. Lea

Petaloconchus domingensis Sowerby Pl. 8, Fig. 15.

Petaloconchus domingensis Sowerby, Quart. Journ. Geol. Soc., Vol. 5, P. 51, Pl. 10, Figs. 9a, b, c, 1849.
Vermetus (Petaloconchus) sculpturatus Dall, Wag. Inst. Sci., Trans., Vol. 3, P. 305, 1892.
Petaloconchus domingensis Pilsbry and Brown, Acad. Nat. Sci. Phil., Proc., Vol. 63, P. 359, 1911.
Petaloconchus domingensis Maury, Bull. Amer. Pal., Vol. 5, No. 29, P. 128, Pl. 22, Fig. 11, 1917.
Petaloconchus domingensis Hubbard, N. Y. Acad. Sci., Vol. 3, Pt. 2, P. 139, 1921.
Petaloconchus sculpturatus Olsson, Bull. Amer. Pal., Vol. 9, No. 39, P. 146, Pl. 14, Figs. 10, 15, 1922.
Petaloconchus domingensis Anderson, Cal. Acad. Sci. Proc., 4th ser., Vol. 16, No. 3, P. 89, 1927.

Only a partial synonymy has been listed above.

The transverse growth lines are numerous on the Colombian specimens. Excellent authorities regard this species as *sculpturatus* H. C. Lea but the writer is inclined to retain the name *domingensis*. The species is closely allied to *P. alcinus* Mansfield[38].

Localities.—Tubera; near Pto. Colombia; near Piedras de Afilar, Dept. Atlantico.

Age.—Miocene.

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[38] U, S. Nat. Mus. Proc., Vol. 66, Art. 22, P. 51, Pl. 9, Figs. 2-4, 1925.

Distribution.—Colombia—Dept. Atlantico, Bolivar.
Venezuela—State of Falcon.
Jamaica—Bowden series.
Costa Rica—Gatun stage, Banana River.
San Domingo—Gurabo formation.
Trinidad—Springvale formation.
Porto Rico—Quebradillas limestone.
Mexico—Tuxtepec.

Family CERITHIIDÆ Menke

Genus POTAMIDES Brong.

Potamides avus Pilsbry and Brown Pl. 8, Figs. 10 - 12

Potamides avus Pilsbry and Brown, Acad. Nat. Sci. Phil. Proc. Vol. 69, P. 34, Pl. 5, Fig. 5, 1917.

Shell of medium size; spire high, rather acutely tapering; whorls about ten, increasing rapidly in size. Whorls carinate medially or submedially, ornamented with 11 to 13 short, pointed nodes on young specimens. Adult forms have from eight to ten nodes. Above this series of coronal tubercles, the whorls are concave, below they are convex on the early whorls, but flat and sloping inward on the later ones. The shell is weakly or strongly striate spirally. On better preserved specimens the penultimate whorl shows a lightly beaded revolving thread about half way between the nodes and the suture. This thread is somewhat more pronounced than the other spirals. The sutures are weakly incised with an occasional pseudo-subsutural band. Body whorl convex above with two stronger spiral cords, one at about the middle, the other a short distance below. Mouth roundly quadrate, small. Anterior canal short, narrow, flexed.

Dimensions: Alt. 30. mm; Width 15 mm.

The specimen figured by Brown and Pilsbry is an adult form. The majority of the specimens in our collection are not quite as fully developed. These have more numerous tubercles than the older ones.

Locality.—Cedral, Dept. of Atlantico.

Age.—Miocene.

Potamides maracaibensis (Willston) Pl. 8, Figs. 8, 9

Potamides maracaibensis Williston, Pal. Falcon, Pl. 8, Fig. 5, 1923. (MS)
Potamides maracaibensis Weisbord. Pal. Venezuela, P. 284, Pl. 4, Figs. 19 - 21, 1924. (MS)

Shell of moderate size, prominently turreted; spire high, about one-half the total length of the shell in size. Whorls about seven, the post-nuclear three or four convex, sculptured with unequal spiral threads. On the third whorl from the last the spiral lines are confined to the upper portion and become obsolete or faint below; the following volutions acquire a series of about six rather sharp nodes which on the shoulder of the whorl are pointed, but have a marked tendency to merge into a Nassa-like fold below the angle. The spiral sculpture is confined to the upper part of the volution. The body whorl is broadly convex above, constricted below. There are some light spiral lines on the medial portion which become more closely spaced and stronger anteriorly. The mouth parts on the Colombian specimens are obscured but on the Venezuelan forms the outer lip is plain, the aperture fairly broad and constricted below into a sinuous anterior canal.

Dimensions: Alt. 39 mm; Width 20 mm.

Locality.—Between Las Perdices and Pto. Colombia, Dept. of Atlantico.

Age.—Miocene.

Distribution.—Venezuela—Urumaco, Falcon. Colombia.

Subgenus LAMPANELLA Moerch

Potamides (Lampanella) ormei Maury Pl. 8, Figs. 6, 7.

Cf. Cerithium suprasulcatus Gabb, Trans. Amer. Phil. Soc., Vol. 15, P. 237, 1873.
Potamides ormei Maury, Bull. Amer. Pal., Vol. 5, P. 290, Pl. 22, Fig. 8, 1917.
Potamides suprasulcatus Pilsbry (partim), Acad. Nat. Sci. Proc., Vol. 73, P. 373, Pl. 29, Fig. 10, 1921.

This sturdy form is characterized by the three rows of heavily noded spiral bands and transverse, slightly arcuate folds. The upper spiral cord is somewhat larger than on the lower two, and below it there is a fairly deep interspace. The body whorl has one or two lightly beaded riblets below the strong subsutural cord. Below these there are about eight, simple subequal revolving lines. The outer lip on all the specimens is broken but it is probably somewhat flaring. The columella is not plicate. Anterior canal short, twisted. There are probably about ten whorls in complete specimens.

Dimensions: Alt. 33 mm; Width 16 mm. (Approximate for whole specimen).

One of our specimens shows the body whorl with four flexuous transverse growth folds. Comparison with the Peruvian *P. ormei* var. *infraliratus* Spieker[39] shows it to be nearly identical except for the blunt anterior canal of the Zorritos species. *P. gastrodon* Pilsbry and Johnson[40] is strikingly similar but possesses a columellar fold.

P. suprasulcatus as figured by Pilsbry (*op. cit.*) under figure ten is undoubtedly the species under discussion. But whether this is the *suprasulcatus* of Gabb I am not assured. None of our Colombian specimens or others in the collection from Santo Domingo in the laboratory are as simply sculptured as that figured under figure 11 by Pilsbry. This may be due to the lack of weathering on our specimens but in the absence of such I prefer to retain Maury's name. *P. transecta* Dall from the Tampa Silex beds of Florida is also of the same type.

Locality.—E. of Esperanza, Dept. of Bolivar.

Age.—Miocene.

Distribution.—Santo Domingo; Colombia.

Subgenus PYRAZISINUS Heilprin

Potamides (Pyrazisinus) bolivarensis n. sp. Pl. 8, Fig. 5.

Shell rather large, with about 13 whorls when complete. There are five strong, flat, spiral bands wider than their interspaces running over strong subequal axial folds. Of the latter there are about 13 on a whorl. Occasionally one of these folds becomes larger than the others, and on the penultimate volution all folds become considerably stronger. The uppermost spiral band is separated by a slightly wider interspace than the remaining four.

The earlier part of the body whorl is sculptured with thick transverse folds but these diminish rapidly in size medially; near the outer lip, however, there is a large fold stronger than any of the others. Below this in the outer lip, there is a protruding lip tooth. The base of the whorl is marked with about ten spiral bands with occasional secondary cords between. The outer lip and anterior canal have been broken. The columella as for as can be observed lacks a columellar fold.

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[39] J. Hop. Univ. Studies in Geol., No. 3, P. 58, Pl. 2, Fig. 11, 1922.

[40] Acad. Nat. Sci. Phil. Proc., Vol. 69, P. 171, 1917. Vol. 73, P. 374, Pl. 32, Figs. 5,6, 1921.

Dimensions: Alt. 57 mm; Width 26 mm. Approximate, when perfect.

This recalls *P. dentilabris* (Gabb) but the Santo Domingan form has a strong oblique plait, a feature which is probably lacking on this species. In the Cornell collection from the Oligocene of Bailey's Ferry, Florida is a strikingly similar form labelled *Pyrazisinus harrisi* Maury, but I have not found this described or figured in the literature. The shell from Florida is somewhat smaller and only has four spiral bands instead of five on the whorls. In other respects, however, they are very similar.

Locality.—E. of Esperanza, Dept. of Bolivar.

Age.—Miocene.

Family NYCTILOCHIDÆ Dall

Genus DISTORSIO Bolten

Distorsio cf. simillimus (Sowerby) Plate 8, fig. 4

Triton simillimus Sowerby, Quart. Journ. Geol. Soc. London, vol. 6, p. 48, 1849.
Distortia simillima Gabb, Amer. Phil. Soc. Trans., vol. 15, p. 212, 1873.
Distortrix simillima Maury, Bull. Amer. Pal., vol. 5, No. 29, p. 271, pl. 17, figs. 4, 5, 1917.
Distorsio constrictus simillimus Pilsbry, Acad. Nat. Sci. Phil., vol. 73, p. 356, 1921.

A single worn specimen is very similar to Sowerby's species, but in the absence of the detailed sculpture I cannot be assured of their specific identity. It is questionable whether *D. gatunensis* Toula from the Gatun formation, *D. simillimus* Guppy from Jamaica, and *D. simillimus* Olsson from Costa Rica should all be considered synonymous with the true *simillimus* from Santo Domingo. The Colombian form seems closest to specimens from the latter locality.

Dimensions: Alt. 39 mm; Width 21 mm.

Locality.— E of Esperanza, Dept. of Bolivar.

Age.— Miocene.

This is much like *D. rimosum* Bôse from the I. J. T. which we have in a collection here but *rimosum* has long, bifurcated ribs not noticeable on the Colombian form.

Distorsio aff. gatunensis Toula Plate 8, fig. 3

Distorsio (Distortrix, Persona) gatunensis Toula, Jahr. K-K. Geol. Reich., vol. 58, p. 700, pl. 25, fig. 10, 1908.
Distorsio gatunensis Brown & Pilsbry, Acad. Nat. Sci. Phil. Proc., vol. 62, p. 356, pl. 26, fig. 8, 1912.
Distorsio gatunensis Pilsbry, Ibid, vol. 73, p. 356, 1921.

The whorls on a weathered specimen are less awry than on *D. simillimus* from Santo Domingo. The Colombian specimen also lacks the prominent angle on the body whorl with the two closely spaced cords. Furthermore, I have been unable to find and strong secondary revolving lines on our specimen, a feature well developed on *simillimus*. Their absence may be due to weathering but of this I am not assured. The nearest similar species is *gatunensis*.

Dimensions: Alt. 48 mm; Width 27 mm.

Locality.— Near Usiacuri, Dept. of Atlantico.

Age.— Miocene.

Genus BURSA Bolten

Bursa crassa colombiana n. subspec. Plate 8, figs. 1, 2

Fossil forms resembling *B. crassa* Dillwyn[41] have been found in Haiti, Costa Rica, Jamaica and Trinidad. The Colombian shell is a slight variant of the recent form and may be considered identical by some. The anal canal of the Colombian form is shorter and slightly more angulate than that of the recent species; nor do any of our specimens exhibit a tendency to produce larger or more elongated nodes on the angle of the body whorl. This latter is a feature on some of the recent shells of the true *crassa*.

One of the fossil forms to which *colombiana* is related is Olsson's[42] *B. crassa* from Costa Rica. The latter differs in lacking the finer interstitial threads between the major cords on the body whorl. From Santo Domingo there are two similar forms, one which has been called *B. crassa proavus* by Pilsbry[43] and the other *B. crassa* by Maury[44]. The former is a stubbier form than ours, while the latter is more like the recent shell in its elongated tubercules on the body whorl, particularly in back. Perhaps the most nearly allied species is *B. crassa bowdenensis* Pilsbry[45] which differs but slightly in having a longer anal canal.

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[41] Reeve, Conch. Icon., fig. 18.
[42] Bull. Amer. Pal., vol, 9, No. 39, p. 306, pl. 15, fig. 15, 1922.

Dimensions: Alt. 41 mm; Width 26 mm.

Localities.— Near Tubera; near Cedral; Morro Hermoso, Dept. Atlantico.

Age.— Middle Miocene.

Superfamily RHACHIGLOSSA Gray

Family COLUMBELLIDÆ

Genus STROMBINA

Strombina cyphonotus Pilsbry & Johnson Plate 7, figs. 9, 10

Strombina gradata Gabb (in part), Amer. Phil. Soc. Trans., vol. 15, p. 221, 1873. not **Columbella gradata** Guppy, Quart. Journ. Geol. Soc. London, vol. 22, p. 288, pl. 16, fig. 10, 1866.

Strombina cyphonotus Pilsbry & Johnson, Acad. Nat. Sci. Phil. Proc. vol. 63, p. 353, pl. 25, figs. 6, 7, 1911.

Strombina cyphonotus Maury, Bull. Amer. Pal., vol. 5, No. 29, p. 97, pl. 15, figs. 7, 8, 1917.

Strombina cyphonotus Pilsbry, Acad. Nat. Sci. Phil. Proc., vol. 73, p. 351, 1921.

A single specimen appears to be identical in every respect with the Santo Domingan form except for a difference in the character of the spiral sculpture on the anterior portion of the shell. On the Santo Domingan specimens the spiral threads are separated by wider interspaces where they are strongest, whereas on the Colombia species the sculpture is in the form of flat bands separated by incised, narrow interspaces. We have only one specimen but I doubt whether this difference is even of varietal importance, inasmuch as there is a tendency for such sculpture to vary on the same species.

Dimensions: Alt. 24 mm; Diam. 12 mm.

This is stubbier than *S. primus* Pilsbry and Johnson[46] and *S.*

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[43] Acad. Nat. Sci. Phil., p. 360, pl. 29, figs. 4, 5, 1921.

[44] Bull. Amer. Pal., vol. 5, p. 272, pl. 17, fig. 8, 1917.

[45] **Op. cit.** also Guppy, Quart. Journ. Geol. Soc. London, vol. 22, p. 288, pl. 18, fig. 9, 1866.

[46] **Op. cit.**, p. 352, pl. 25, figs. 9, 10, 1911.

lessepsiana Brown and Pilsbry[47] from the Canal Zone, besides differing in the strength and position of the body humps. *Columbella gatunensis* Toula[48] is probably equivalent to *lessepsiana.*

Locality.— Between Las Perdices and Pto. Colombia, Dept. of Atlantico.

Age.— Miocene.

Distribution.— Colombia; Santo Domingo.

Strombina colombiana n. sp. Plate 7, figs. 11, 12

Shell polished, fusiform, slightly askew, with a rather acutely tapering spire. Whorls about 11 when complete. These are flat above, but slightly convex below; sutures narrow. Body whorl globosely triangular, swollen above, acutely narrowing below, with an obtuse dorsal hump near the suture, and a slight swelling on the left side of the ventral face. Outer lip thickened, denticulated within with about 7 lirae. Columella with a faint suggestion of about three plaits. Anal fasciole, a narrow slit. Anterior canal short, flexed, somewhat wider below than above. Shell devoid of markings except on the anterior portion of the body whorl where there are faint revolving lines. It is difficult to say whether the absence of markings has been due to weathering or to the nature of the species.

Dimensions: Alt. 24 mm; Diam. 13 mm.

This differs from the foregoing in having a more globose form and lacking the longitudinal wrinkles. It is characterized by its porcelaneous shell and absence of sculpture.

Locality.— Near Tuberá, Dept. of Atlantico.

Age.— Miocene.

Family BUCCINIDÆ Troschel

Genus MELONGENA Schumacher

Melongena colombiana n. sp. Plate 7, figs. 2-4

Shell fairly large, quadrate. Spire shortly conic or conic depressed. Whorls about eight of which the earliest are weathered so as to obscure their characters. The body whorl is garnished with three rows of pointed spines each with about 6 spines or 18 in all. The upper row appears at or on the suture; the second row comes at the shoulder of the whorl, and the third about half way down. Between the upper and second series of spines, the whorl is concave with four or five prominent revolving lines; between the second and lowest series there are about nine spiral cords, and about seven below the lower series. Over the whole are fine arcuate growth striæ.

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[47] Ibid, p. 352, pl. 25, figs. 11, 12.

[48] Jahr. K-K Geol. Reich., p. 501, pl. 30, fig. 8, 1911.

The penultimate and the fourth from the last whorl is composed of an irregular blob of calcium carbonate much the same as the Eocene *Volutilithes* (*Plejona*) forms are wont to have. These often cover part of the whorl above. The remaining whorls are sculptured with radiating folds which on the third from the last whorl tends to develop into spines near the suture. The folds have a stellate appearance when viewed from above and are crossed by revolving striæ.

The anterior canal is quite broad and somewhat twisted. Umbilicus obsolete. Above it is a coarse revolving ridge. Inner lip with faint lines.

Dimensions: Alt. 60 mm; Width 41 mm.

The Colombian shell recalls *M. orthacantha* Pilsbry and Johnson from Santo Domingo but is larger and has three instead of two series of spines on the body whorl.

Locality.— E. of Esperanza, Dept. of Bolivar.

Age.— Miocene.

Melongena consors (Sowerby) Plate 7, fig. 5

Pyrula consors Sowerby, Quart Journ. Geol. Soc. London, vol. 5, p. 49, 1849.

Melongena consors Dall, Wag. Inst. Sci. Trans., vol. 3, p. 1584, 1903.

Melongena consors Maury, Bull. Amer. Pal., vol. 5, No. 29, p. 85, pl. 14, fig. 5, 1917.

Melongena consors Olsson. **Ibid**, vol. 9, No. 39, p. 112, 1922.

Melongena consors Weisbord, Pal. Venezuela, p. 294, pl. 7, figs. 1, 2, 1924.

Melongene consors Maury, Bull. Amer. Pal., vol. 10, No. 42, p. 208, pl. 35, fig. 12, 1925.

This is a common Caribbean Miocene species. It is characterized by its three rows of spines on the upper part of the body whorl and a single row below. The earlier volutions are sculptured with transverse folds and spiral threads.

Dimensions: Alt. 75 mm; Width 50 mm.

Localities.— Near Usiacuri; Near Puerto Colombia; between Sibarco and Piedras de Afilar; Dept. of Atlantico.

Age.— Miocene.

Distribution: Santo Domingo; Bowden, Jamaica; Springvale, Brasso and Manzanilla beds of Trinidad; Costa Rica; Falcon, Venezuela; Colombia.

Genus SOLENOSTEIRA Dall

Solenosteira falconensis (Williston) Plate 7, figs. 6-8

Solenosteira falconensis Williston, Pal. Falcon, pl. 7, figs. 12, 13, 1923. (MS)
Solenosteira falconensis Weisbord, Pal. Venezuela, p. 296, pl. 6, figs. 8, 9, 1924. (MS)

Shell biconic, solid, attaining a rather large size; spire somewhat less than half the length of the shell, acuminate. Whorls about eight, ornamented with subequal spiral threads and about eight transverse folds which merge into short pointed spines on the periphery. The whorls are slightly concave above, but just above the suture they become perpendicular. It is on this narrow portion that the sharply pointed folds appear. Body whorl convex above, sharply concave below. The contour of the last volution is much like the figure S. It is covered with numerous elevated revolving cords with a number of secondary threads between. The spiral cords become stronger just below the convexity of the whorl. In addition a closely spaced series of longitudinal, sinuous growth striæ overrun the shell. Outer lip subangulate, marginally fluted within, inner lip with a rather thick callus; umbilicus narrow, margined above by a thickened callus; anterior canal of moderate size for the genus, slightly flexed.

On old specimens the upper part of the body whorl is slightly convex above the peripheral series of nodes. The part of the shell behind the outer lip is traversed by about four or five, rather strong, thick, transverse folds extending from the suture to below the middle of the volution.

Dimensions: Alt. 42 mm; Width 29 mm.
Alt. 61 mm; Width 40 mm.

This is not unlike the Peruvian *S. alternata* (Nelson), but the present species has sharper nodes which are situated on the lower fourth of the whorl, whereas the angle of the whorl in the former is nearly medial. *S. dalli* Brown & Pilsbry is also very similar but has fewer and stronger spiral cords and a more medial position of the angle of the whorl. This species was first recorded from Venezuela.

Locality.— Near Tuberá; Near Usiacuri, Dept. of Atlantico.

Age.— Miocene.

Distribution.— Colombia — Dept. of Atlantico.
Venezuela — N. of Urumaco, Falcon.

Solenosteira cochlearis Guppy var. **magdalenensis** n. var., Plate 6, figs. 16, 17

Shell pyriform, solid. Whorls about seven, sculptured with strong, elevated, revolving ridges separated by wider interspaces. The grooves bear obsolete secondary spiral threads and closely spaced transverse growth striæ. In addition there are about twelve, thickened, longitudinal folds. Body whorl well rounded above, sharply tapering and somewhat concave below. The spiral ribs become somewhat stronger anteriorly. Inner lip lightly coloused. Umbilicus narrow. Outer lip strongly lirate within with about 14 liræ, being two less in number than the spiral cords of the body whorl. Anterior canal of moderate length, broad, slightly flexed.

Dimensions: Alt. 35 mm; Width 22 mm.

The form is closely akin to *S. cochlearis* Guppy[49] from the Springvale series of Trinidad. It differs varietally in having a slightly less globose body whorl, in having more and longer longitudinal nodes, and in the character of the ribbing. *S. cochlearis* has triangular ribs on the body whorl and are rather sharply ridged, whereas the ribs on the Colombian are elevated ridges and do not perceptibly broaden toward the interspace. *S. cochlearis* is a slightly more developed form than *S. semiglobosa* Guppy from the same series.

Locality.— One-half kilometer west of Piedras de Afilar, Dept. of Atlantico.

Age.— Middle Miocene.

Collector.— Mr. C. C. Addison.

Family VASIDÆ Adams

Genus XANCUS Bolten

Xancus magdalenensis n. sp. Plate 7, fig. 1

Shell ponderous, solid and heavy; spire with about 9 or 10 whorls when complete. Earlier whorls with about 6 wide rounded costæ at about the middle. These costæ later develop into large protruding rather pointed knobs. The whorls are sculptured with fairly strong revolving liræ and intercalary finer threads. On the later whorls, transverse growth lines become numerous and give a reticulate pattern to them. Sutures narrow, well incised. Body whorl nearly smooth above, but ornamented below with alternating stronger and finer revolving lines, crossed by fine transverse growth striæ. There are three strong columellar plaits, the anterior one slightly sulcate. Below this there is another weak fold. Umbilicus narrow and deep. Anterior canal long and narrow.

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[49] Bull. Amer. Pal., vol. 10, No. 42, p. 210, pl. 36, fig. 3, 1925.

Dimensions: Alt. (when whole) 190 mm; Aproximate width 93 mm.

This species is characterized by its five projecting knobs on each whorl and four columellar folds, of which the anterior is the weakest. The distance between the lower two plaits is about one-fourth that between the upper two.

This is very close to the recent *X. scolymus* but has fewer knobs and an additional columellar fold. This same distinction holds for *X. rex* Pilsbry and Johnson. In addition *rex* has decidedly more pronounced transverse growth striæ on the later whorls. *X. scopulus* Olsson from the Miocene of Costa Rica has a pronounced excavated sutural zone, a feature not present on this species.

Locality.— Near Tuberá, Dept. of Atlantico.

Age.— Middle Miocene.

Collector.— Mr. C. C. Addison.

Family VOLUTIDÆ Gray

Genus MITRA Lamarck

Mitra colombiana n. sp. Plate 6, figs. 11, 12

Cf. **Mitra henekeni** Hubbard, N. Y. Acad. Sci., vol. 3, pt. 2, p. 155, pl. 24, fig. 1, 1920

Shell slender, biconic; whorls about nine, sculptured with strong, raised, revolving cords separated by wide interspaces. The interspaces are sculptured with subequal, longitudinal threads. The body whorl is slenderly pyriform in shape with a maximum of about 13 revolving cords. Columella with four and possibly five plaits, of which the upper two are the strongest. Columella of moderate length, slightly twisted below.

Dimensions: Alt. 26 mm; Long. 8mm.

This species at once recalls *M. heneheni* Sowerby and *M. longa* Gabb. From the former it may be distinguished by its fewer revolving cords and one or two more columellar folds. Younger specimens of *heneheni* about the same size of our specimens generaally have three folds; very seldom there is a suggestion of a fourth. On the Colombian species, however, there are four well defined plaits on one specimen and five on the other. In this respect the species is similar to *M. longa* but the latter has a few more revolving cords with interstitial threads, a feature lacking on the present species.

Hubbard (*op. cit.,*) has figured a species from the Quebradillas limestone of Porto Rico which he has referred to *heneheni.* Our form is superficially very similar to Hubbard's — more so than to the true *heneheni.* The spacing of the revolving riblets on the Porto Rican shell is identical with that of the Colombian species. Unfortunately the mouth parts of the former are broken.

Localities.— Near Tuberá; between Las Perdices and Puerto Colombia, in the Dept. of Atlantico. E of Esperanza, Dept. of Boliver.

Age.— Middle Miocene.

Mitra cf. limonensis Olsson Plate 6, fig. 13

Mitra Swainsoni Broderip var. **limonensis** Olsson, Bull. Amer. Pal., vol. 9, No. 39, p. 272, pl. 6, fig. 1, 1922.

A single broken specimen, altho somewhat smaller than the Costa Rican form, appears to be nearly identical with it. Neither Olsson's nor our form show the characteristic transverse flexuous folds of *M. swainsoni* and for this reason I prefer to omit the varietal affiliation to *swainsoni.*

Dimensions: Alt. 36 mm; width 14 mm. (Aprox.)

Locality.— Near Tuberá, Dept. of Atlantico.

Age.— Miocene.

Genus CONOMITRA Conrad

Conomitra caribbeana n. sp. Plate 6, figs. 14, 15

Shell rather small, solid, coniform. Spire short, conic. Whorls seven, moderately convex, ornamented with low, flat spiral bands and transverse folds. The spiral bands are separated by narrower or equal interspaces. Body whorl shaped as in *Conus,* slightly convex above and narrowing rather gradually anteriorly. There are about 23 longitudinal riblets on it. Inner lip with four plaits of which the upper three are strongest and nearly horizontal, the fourth weaker and oblique.

This shell recalls the genus *Imbricaria* in shape. It is readily identified by its coniform outline and numerous *Lyria*-like ribs.

Locality.— Near Tuberá, Dept. of Atlantico.

Age.— Miocene.

Family OLIVIDÆ Orbigny

Genus OLIVA Martyn

Oliva cylindrica Sowerby Plate 8, fig. 7

Oliva cylindrica Sowerby, Quart Journ. Geol. Soc. London, vol. 5, p. 45, 1849.
Oliva cylindrica Gabb, Trans. Amer. Phil. Soc., vol. 15, p. 215, 1873.
Oliva cylindrica Guppy, Quart. Journ. Geol. Soc. London, vol. 32, p. 256, 1876.
Oliva cylindrica Cossman, Journ. de Conch., vol. 61, p. 57, pl. 5, figs. 2, 3, 1913.
Oliva cylindrica Dall, Wag. Inst. Sci. Trans., vol. 3, p. 1583, 1903.
Oliva cylindrica Maury, Bull. Amer. Pal., vol. 5, No. 29, p. 67, pl. 10, figs. 14, 14a, 1917.

Oliva cylindrica Maury, Ibid, vol. 10, No. 42, p. 195,pl. 33, figs. 3, 5, 1925.

Some of the Colombian shells are just a trifle less slender in the body whorl than specimens from the type locality, but in other respects are identical. Several years ago the writer collected several *Olivas* from the State of Falcon, Venezuela which are probably referable to *O. cylindrica.*

Dimensions: Alt. 31 mm; Width 14 mm.

This differs from *O. sayana immortua* Pilsbry and Brown[50] in having the top of the outer lip come some distance below the suture of the adjoining whorl.

Localities.— Between Las Perdices and Puerto Colombia; near Piedras de Afilar; near Usiacuri, in the Dept. of Atlantico.

Age.— Miocene.

Distribution.— Santo Domingo; Jamaica; Trinidad; Venezuela; Colombia.

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[50] Acad. Nat. Sci. Phil. Proc., vol. 69, p. 33, pl. 5, fig. 6, 1917.

Superfamily TOXOGLOSSA Troschel

Family CANCELLARIIDÆ Adams

Genus CANCELLARIA Lamarck

Cancellaria dariena Toula Plate 6, fig. 8

Cancellaria dariena Toula, Jahr. K-K. Geol. Reich., vol. 58, p. 31, pl. 25, fig. 13; pl. 28, fig. 2, 1909.
Cancellaria dariena Brown & Pilsbry, Acad. Nat. Sci. Proc., vol. 63, p. 345, pl. 24, figs. 3, 4, 1911.
Cancellaria dariensis Cossmann, Journ. Conch., vol. 61, p. 51, pl. 4, figs. 9, 10, 1913.
Cancellaria dariena Pilsbry & Brown, Acad. Nat. Sci. Phil. Proc., vol. 69, p. 32, 1917.
Cancellaria dariena Olsson, Bull. Amer. Pal., vol. 9, No. 39, p. 80, pl. 6, fig. 8, 1922.

Most specimens have a thickened transverse fold or varix at the outer lip or about the middle of the body whorl in back.

Dimensions: Alt. 40 mm; Width 20 mm.

This species has much in common with such forms as *C. barretti* Guppy, *C. epistomifera* Guppy and *C. guppyi* Gabb, but these have somewhat finer and more numerous transverse ribs. *C. rowelli* Dall is distinguished by the step-like succession of whorls and heavy, subequal transverse folds. *C. cossmanni* Olsson has a more widely spaced series of spiral and longitudinal riblets reticulating the shell into large clear cut squares.

Localities.— Near Pto. Colombia; near Tuberá, Dept. of Atlantico.

Age.— Miocene.

Distribution.— Colombia—Near Cartagena (Pilsbry&Brown)
Panama—Canal Zone; Water Cay.
Costa Rica—Rio Cocles.
Martinique?—(Cossman).

Cancellaria rowelli Dall Plate 6, figs. 9, 10

Cancellaria rowelli Dall, U. S. Nat. Mus. Proc., vol. 19, p. 307, pl. 29, fig. 1, 1896.
Cancellaria rowelli Maury, Bull. Amer. Pal., vol. 5, No. 29, p. 63, pl. 10, fig. 2, 1917.
Cancellaria rowelli Pilsbry, Acad. Nat. Sci. Phil. Proc., vol. 73, p. 333, 1921.
Cancellaria rowelli Olsson, Bull. Amer. Pa., vol. 9, No. 39, p. 84, pl. 6, fig. 7, 1922.

A single specimen appears to be referable to this species. The longitudinal ribs are about 21 in number and are strongly developed.

Dimensions: Alt. 23 mm; Width 15 mm.

C. harrisi Maury[51] is a very similar form and may be a mutation of this species.

Locality.— Between Esperanza and Jesus del Monte, Dept. of Atlantico.

Age.— Lower - Middle Miocene.

Distribution.— San Domingo—Rio Anima.
Costa Rica—East Grape Creek.

Cancellaria epistomifera Guppy var. **acuticarinata** n. var. Plate 6, fig. 7

The Colombian shell varies from the true *epistomifera* in having a rather sharp keel on the whorls. Part of the outer lip on our single specimen is broken but there seems to be no tendency to develop a spout or sulcus as on *epistomifera* proper. Further, there are no thickened transverse folds or varices but inasmuch as there is only one specimen I do not know if this is a constant feature or not.

Dimensions: Alt. 28 mm; Width 18 mm.

Locality.— Near Tuberá, Dept. of Atlantico.

Age.— Miocene.

Family TEREBRIDÆ Adams

Genus TEREBRA Lamarck

Terebra gatunensis Toula Plate 6, fig. 4

Terebra gatunensis Toula, Jahr. K-K Geol. Reich., vol. 58, p. 705, pl. 25, fig. 14, 1909.
Terebra gatunensis Brown & Pilsbry, Acad. Nat. Sci. Phil. Proc., vol. 63, p. 339, pl. 22, fig. 2, 1911.
Terebra (Myurella) gatunensis Cossmann, Journ. Conch., vol. 61, p. 13, pl. 1, figs. 26 - 29, 1913.
Terebra gatunensis Maury, Bull. Amer. Pal. vol. 5, No. 29, p. 31, pl. 4, fig. 5, 1917.
Terebra gatunensis Olsson, Bull. Amer. Pal., vol. 9, No. 39, p. 36, pl. 1, figs. 4 - 6, 1922.
Terebra gatunensis Anderson, Cal. Acad. Sci. Proc., 4th ser., vol. 16, No. 3, p. 89, 1927.

Specimens of *T. wolfgangi* Toula in the paleontological collection at Cornell differ from *gatunensis* in being smaller, more slender, and with the axial riblets far more prominent than the spiral cords.

Dimensions: Alt. 40 mm; Diam. 12 mm.

[51] Bull. Amer. Pal., vol. 5, No. 29, p. 64, pl. 10, figs. 9, 10, 1917.

Localities.— Cedral; near Piedras de Afilar, Dept. of Atlantico; E. Esperanza, Dept. of Bolivar.

Age.— Miocène.

Distribution.— Colombia—Depts. of Atlantico and Bolivar.
Venezuela—Urumaco, Sabaneta, State of Falcon.
Canal Zone—Gatun, Mount Hope.
Martinique.
Santo Domingo—Cercado de Mao.

Terebra bipartita Sowerby Plate 6, fig. 2

Terebra bipartita Sowerby, Quart. Journ. Geol. Soc. London, vol. 5, p. 47, 1849.
Terebra bipartita Gabb, Trans. Amer. Phil. Soc., vol. 15, p. 225, 1873.
Terebra (Acus) bipartita Dall, U. S. Nat. Mus. Proc., vol. 18, p. 38, 1895.
Terebra bipartita Maury, Bull. Amer. Pal., vol. 5, p. 187, pl. 3, fig. 14, 1917.
Terebra bipartita Olsson, **Ibid**, vol. 9, No. 39, p. 35, pl. 1, figs. 1, 2, 1922.
Terebra bipartita Anderson, Calif. Acad. Nat. Sci. Proc., 4th ser., vol. 16, No. 3, p. 89, 1927.

Two crushed fragments appear to be referable to this species. *T. subsulcifera* has a more prominent sutural band.

Dimensions: Alt. 45 mm; Width 11 mm.

Locality.— Morro Hermoso, Dept. of Atlantico.

Age.— Miocene.

Distribution.— Colombia; Santo Domingo; Costa Rica.

Terebra isaacpetiti? Maury Plate 6, fig. 3

Terebra Petiti Maury, Bull. Amer. Pal., vol. 5, No. 29, p. 31, pl. 4, fig. 4, 1917. Not of Kiener, Coq. Viv., p. 37, pl. 13, fig. 2.
Terebra isaacpetiti Maury, Bull. Amer. Pal., vol. 10, No. 42, p. 184, 1925.

Comparison with the large specimen of *isaacpetiti* in our Sto. Domingo collection shows a fragment from Colombia to be practically identical. This is one of the *inaequalis* group.

Dimensions: Alt. 32 mm; Diam. 16 mm. (Last 3 whorls.)

Locality.— Near Tuberá?, Dept. of Atlantico.

Age.— Miocene.

Distribution.— Colombia—Dept. of Atlantico.
Santo Domingo—Rio Gurabo.

Family TURRITIDÆ Adams

Genus TURRIS Bolten

Turris albida barretti (Guppy) Plate 6, fig. 5

Pleurotoma Barretti Guppy, Quart. Journ. Geol. Soc. London, vol. 22, p. 290, pl. 17, fig. 6, 1866.
Pleurotomella albida Olsson, Bull. Amer. Pal., vol. 9, No. 39, p. 59, pl. 4, figs. 1, 2, 1922.

The Colombian shell here figured is characterized by a strong medial keel on the whorls and a somewhat weaker revolving riblet above and below. Of the various *albida* forms, this shell is the nearest *T. barretti* originally described from Jamaica.

Dimensions: Alt. 45 mm; Diam. 16 mm.

Dall[52] and others following his lead regard a number of variable forms as being synonymous with *T. albida* a recent form first figured by Perry[53]. In comparing our specimens with Perry's figure, we found the resemblance to be very close but the recent species lacks the rather prominent cord above the medial keel. *P. haitensis* Sowerby[54] is characterized by its numerous revolving riblets standing out in sharp relief. The other forms of *albida* have been listed by Maury[55] and their affinities noted.

Locality.— E. of Esperanza, Dep't. of Bolivar.

Age.— Miocene.

Distribution— Jamaica; Venezuela; Colombia.

Turris albida virgo Lamarck Plate 6, fig. 6

Pleurotoma virgo Lamarck An. s. Vert., vol. 7, p. 94, 1822.
Pleurotoma virgo Kiener, p. 5, pl. 3, fig. 1.
Pleurotoma albida Böse & Toula, Jahr. der K-K Geol. Reich., vol. 60, p. 241, pl. 13, fig. 18, 1910.

The Colombian specimens are nearly identical with the figure of *virgo* in Kiener (*op. cit.*) but are not as strongly striated transversely. The whorls are sculptured with three sharp revolving ribs of which the medial is the strongest. Slightly weaker ones occur above and below the suture of the whorl. In the wide interspaces are weak secondary threads. The suture is nearly indistinguishable.

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[52] Mus. Comp. Zool. Bull., vol. 18, p. 72, 1899.
[53] Conchology or the Natural History of Shells, pl. 32, fig. 4, 1811.
[54] Quart. Journ. Geol. Soc. London, vol. 6, p. 50, 1849.
[55] Bull. Amer. Pal., vol. 5, No. 29, p. 50, 1917.

Dimensions: Alt. 52 mm; Diam. 15 mm.

This is of the *albida* group, the synonymy of which is given by Dall and others. Of the various Miocene forms of *albida* this seems to be the closest to that figured by Bőse and Toula from the Isthmus of Tehuantepec.

Locality.— Near Tuberá, Dept. of Atlantico.

Age.— Miocene.

Distribution.— Caribbean area.

Range.— Oligocene - Recent.

Genus SURCULA H. and A. Adams

Surcula nuevagranada n. sp. Plate 5, fig. 15

Shell fusiform, turreted; spire rather sharply tapering. Whorls about eleven, lightly keeled above the center, convex below, concave above. Sutures lightly impressed, bordered below by a small sutural cord. Whorls sculptured on the lower part with about twelve strong oblique transverse folds which are crossed by four or five spiral cords with weaker revolving striæ between. The concave portion of the whorl is smooth except for curved growth marks. Aperture subovate; anterior canal rather long, narrow, twisted.

Body whorl very convex above, sculptured anteriorly with subequal revolving cords. The longitudinal ribs extend about half way down the volution.

Dimensions: Alt. 37 mm; Diam. 14 mm.

Closely allied to the San Domingan *Drillia cercadonis* Maury[56] but is larger and has a slightly more twisted anterior canal. From the Isthmus of Tehuantepec, Mexico, Bôse[57] has described a closely related form named *S. pearsoni*, but the Colombian shell differs in having a more globose body whorl and a more excavated portion below the suture.

Locality.— Near Puerto Colombia, Dept. of Atlantico.

Age.— Miocene.

Collector.— Mr. C. C. Addison.

[56] Bull. Amer. Pal., vol. 5, No. 29, p. 52, pl. 8, fig. 12, 1917.

[57] Jahr. K-K Geol. Reich., vol. 60, p. 268, pl. 13, fig. 21, 1910.

Genus DRILLIA Gray

Drillia puertocolombiana n. sp. Plate 5, fig. 16

Shell of medium size, solid, turreted. Whorls 6+, convex, standing out sharply. Sculpture consists of 5 low flat spiral bands, separated by slightly narrower interspaces, and numerous sharp, oblique, transverse ribs, of which there are 22 to 26 in number. On reaching the top of the whorl these ribs bend considerably. Sutural zone deep; sutural line weak, bordered below by a sutural band. Below this there is a well channeled interspace between the top of the whorl and the sutural band. Outer lip with what appears to be a thickened fold or varix on back. Aperture subovate.

Dimensions: Alt. 43 mm; Diam. 16 mm; (Approximate when complete.)

Characterized by its deep sutural zone, flat spiral bands and numerous oblique transverse folds. It recalls *D. gatunensis* Toula from the Canal Zone but differs in its fewer spiral bands, and strong, excavated sutural area. *D. consors* Sowerby is more finely reticulate while the rather closely akin *D. venusta* Sowerby has sharper spiral threads.

Locality.— Between Las Perdices and Pto. Colombia?, Dept. of Atlantico.

Age.— Miocene.

Genus CYTHARA Schumacher

Cythara heptagona? (Gabb) Plate 5, figs. 13, 14

Mangelia heptagona Gabb, Amer. Phil. Soc. Trans., vol. 15, p. 211, 1873.
Cythara terminula Dall, Wag. Inst. Sci. Trans., vol. 3, pt. 1, p. 38, pl. 2, fig.5, 1890.
Cythara heptagona Pilsbry, Acad. Nat. Sci. Proc., vol. 73, p. 322, pl. 17, fig. 9, 1921.

A weathered specimen from Colombia is identical with *C. heptagona* in shape and dimensions. In the character of the spiral sculpture and in the number of longitudinal ribs (nine) the shell is similar to *C. terminula* Dall. Gabb originally described *heptagona* as having seven longitudinal folds but as intimated by Pilsbry, who regards *terminula* as synonymous, the number may vary somewhat.

Dimensions: Alt. 15 mm; Diam. 7 mm.

This is very similar to *C. cercadica* Maury[58] from Santo Do- and *C. caimitica* Maury have nearly double the number of long- mingo but the latter is slightly more slender. *C. polygana* Gabb itudinal ribs. From Costa Rica, Olsson[59] has described two forms of which *C. terminula* var. *costaricensis* is closely related. It is a trifle more slender than the Colombian species but with a greater number of specimens for comparison the two forms may be found to be synonymous. The other Costa Rican species, *C. liminata* Olsson is a narrow, higher spired species.

Of the Caribbean *Cytharas,* three are very similar, these are:

C. heptagona Gabb
C. cercaidca Maury
C. terminula var. *costaricensis* Olsson

All these in turn are closely allied to the Pliocene *C. terminula* Dall of the Caloosahatchie series of Florida.

Family CONIDÆ Adams

Genus CONUS Linné

Conus molis Brown & Pilsbry Plate 6, fig. 1

Conus molis Brown & Pilsbry, Acad. Nat. Sci. Phil. Proc., vol. 63, p. 343, pl. 23, fig. 1, 1911.
Conus molis Maury, Bull. Amer. Pal., vol. 5, No. 29, p. 200, 1917.
Conus molis Olsson, **Ibid**, vol. 9, No. 39, p. 214, pl. 2, figs. 1, 2, 1922
Conus molis Anderson, Cal. Acad. Sci. Proc., 4th ser., vol. 16, No. 3, p. 89, 1927

Adult shells are large and ponderous. There are about 13 whorls of which the later ones are somewhat concave and spirally striate with five to eight revolving striæ. The striations on the body whorls of large specimens are confined to the lower portion of the shell and are faint or obsolete above.

Dimensions: Alt. 140 mm; Width 87 mm; Adult when complete.

Localities: Near Tuberá, Dept. of Atlantico.

Age: Miocene.

Distribution: Panama—Gatun.
Costa Rica—Water Cay, Banana river.
Haiti—Cercado de Mao.
Colombia—Tuberá.

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[58] Bull. Amer. Pal., vol. 5, No. 29, p. 61, pl. 9, fig. 15, 1917.
[59] **Ibid**, vol. 9, No. 39, p. 77, 1922.

Conus colombiensis n. sp. Plate 5, fig. 12

This species is thin-shelled. There are about 12 whorls, of which the earlier five or six appear to be somewhat coronate; the whorls are very convex, each succeeding one slightly overlapping on the preceding; sutures well incised; spire slightly elevated, concavely conical. The body whorl is well rounded at the shoulder. From the middle portion of the last whorl to the base there is a series of subequal revolving lines. These become obsolete above.

Dimensions: Alt. 58 mm; Width 34 mm.

The Caribbean Miocene analogue of this shell is *C. recognitus* Guppy which has been found in Costa Rica, Haiti and Jamaica The body whorl of *recognitus* is distinctly pyriform whereas the Colombian shell is conical in shape. Otherwise the two forms are very similar.

Locality.— Near Tuberá, Dept. of Atlantico.

Age.— Middle Miocene.

END OF TEXT

The following plates were furnished by the author

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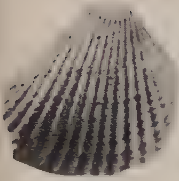
7	—**Scapharca chiriquiensis** Gabb var. **bolivari** Weisbord n. var. Interior of small left valve. Alt. 26 mm; Long 31 mm.	8
8	—**Scapharca chiriquiensis** Gabb var. **bolivari** Weisbord n. var. Exterior of elongated variety. Alt. 29 mm; Long. 36 mm.	8
9	—**Scapharca chiriquiensis** Gabb var. **bolivari** Weisbord n. var. Interior of same specimen.	8
10	—**Scapharca pittieri** Dall. Near Sibarco, Atlantico. Exterior of right valve. Alt. 22 mm; Long. 23 mm.	9
11	—**Scapharca pittieri** Dall. Interior of same specimen.	9
12	—**Glycimeris lloydsmithi** Pilsbry & Brown. Exterior of right valve. Alt. 37 mm; Long. 35 mm.	10
13	—**Glycimeris lloydsmithi** Pilsbry & Brown. Interior of same specimen.	10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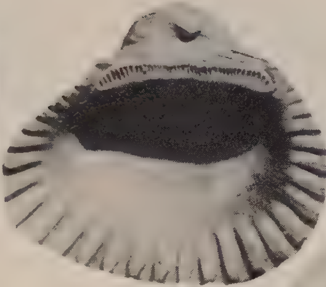
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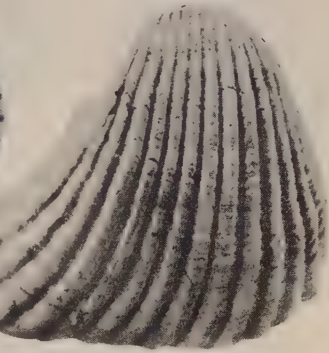
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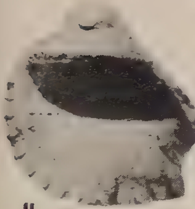
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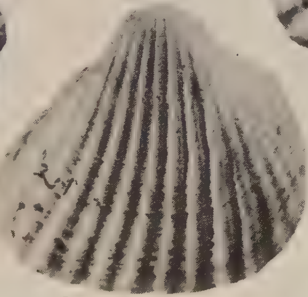
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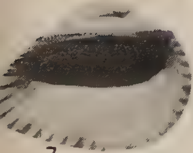
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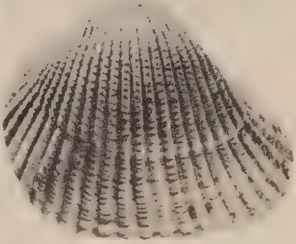
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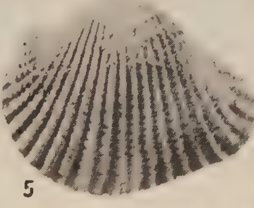
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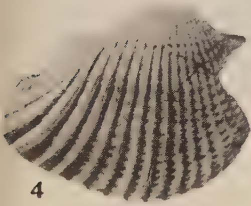
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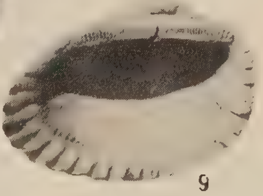
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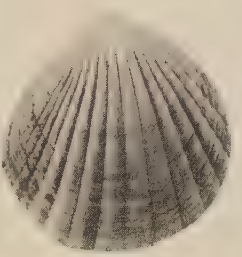
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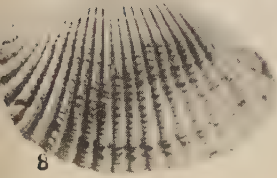
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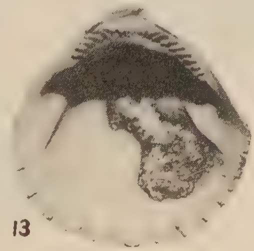
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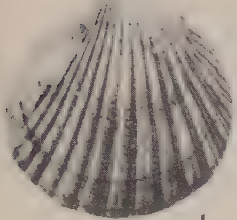
EXPLANATION OF PLATE 2

FIGURE	PAGE
1—**Glycimeris lloydsmithi multicostata** Weisbord n. subsp. Exterior of right valve. Alt. 36 mm; Long. 34 mm.	10
2—**Glycimeris lloydsmithi multicostata** Weisbord n. subsp. Interior of same specimen.	10
3—**Glycimeris canalis** var. **colombiensis** Weisbord n. var. Exterior of left valve. Alt. 25 mm; Long. 26 mm.	11
4—**Glycimeris canalis** var. **colombiensis** Weisbord n. var. Interior of left valve. Alt. 24 mm; Long. 22 mm.	11
5—**Glycimeris** cf. **tumefactus** Pilsbry & Brown. Near Tuberá, Atlantico. Alt. 42 mm; Long. 44 mm. (Approximately)	11
6—**Ostrea osculum** Pilsbry & Brown. Near Usiacuri, Atlantico. Exterior of lower (left) valve. Alt. 26 mm; Long. 22 mm.	12
7—**Ostrea osculum** Pilsbry & Brown. Interior of lower (left) valve. Alt. 42 mm; Long. 30 mm.	12
8—**Ostrea messor colombiensis** Weisbord n. subsp. Near Piedras de Afilar, Atlantico. Interior of lower (left) valve. Alt. 53 mm; Width 33 mm.	12
9—**Ostrea messor colombiensis** Weisbord n. subsp. Exterior of same specimen.	12
10—**Spondylus colombiensis** Weisbord n. sp. Near Tuberá, Atlantico. Interior of right valve. Alt. 75 mm; Long. 65 mm.	14
11—**Spondylus colombiensis** Weisbord n. sp. Exterior of same specimen.	14
12—**Venericardia dominica** new name. Exterior of left valve. Near Piedras de Afilar, Atlantico. Alt. 20 mm; Long. 20 mm.	17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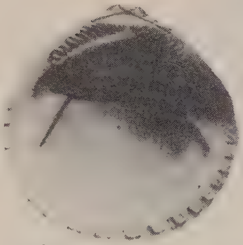
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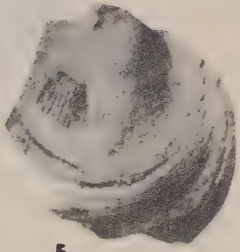
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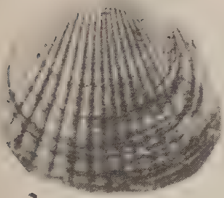
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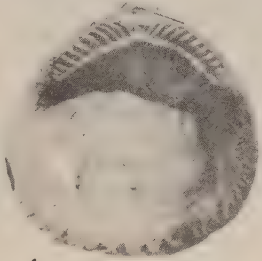
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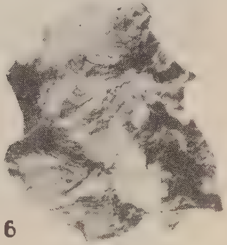
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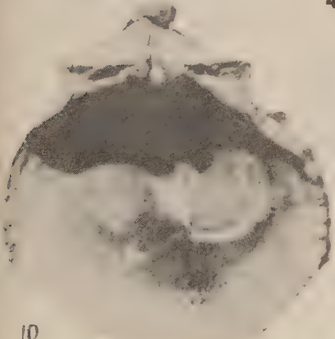
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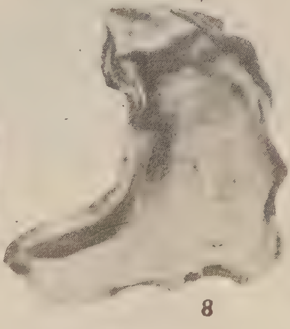
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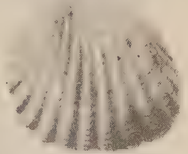
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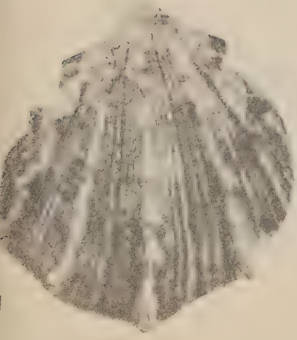
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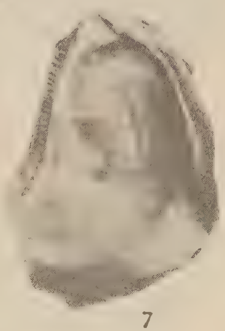
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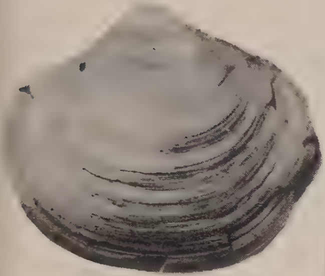
EXPLANATION OF PLATE 3

FIGURE	PAGE
1—**Amusium luna** Brown & Pilsbry. Near Usiacuri, Atlantico. Alt. 115 mm; Width 120 mm.	13
2—**?Dermatomya harrisi** Weisbord n. sp. Near Tuberá, Atlantico. Alt. 43 mm; Long. 52 mm.	15
3—**Crassatellites reevei** Gabb var. **pleurorostra** n. var. Exterior of right valve. Alt. 40 mm; Long. 57 mm.	16
4—**Crassatellites reevei** Gabb var. **pleurorostra** n. var. Interior of same specimen.	16
5—**Crassatellites aviaguensis** Hodson. Near Usiacuri, Atlantico. Exterior of left valve. Alt. 50 mm; Long. 65 mm.	16
6—**Crassatellites aviaguensis** Hodson. Interior of same specimen showing large lunule.	16
7—**Venericardia terryi** Olsson. Specimen from Costa Rica figured for comparison. Right valve.	18
8—**Venericardia terryi** Olsson. Colombian specimen. Exterior of right valve. Alt. 32 mm; Long. 30 mm.	18
9—**Venericardia terryi** Olsson. Interior of same specimen.	18
10—**Venericardia dominica** new name. Near Piedras de Afilar, Atlantico. Interior of left valve. Alt. 20 mm; Long. 20 mm.	17
11—**Venericardia dominica** new name. Exterior of right valve. Alt. 24 mm; Long. 25 mm.	17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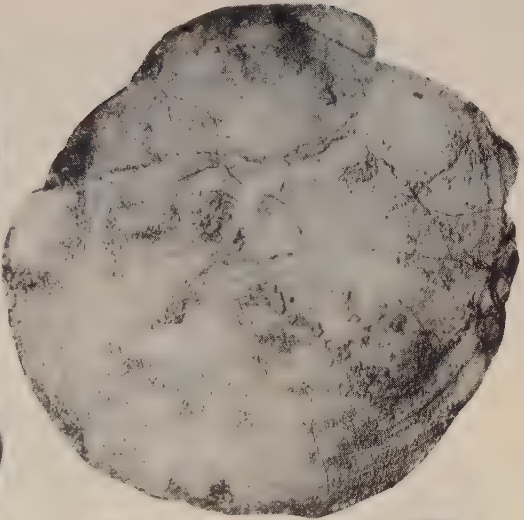
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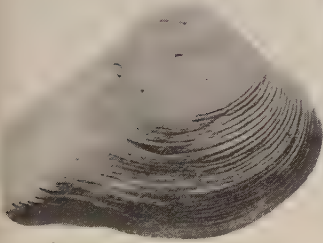
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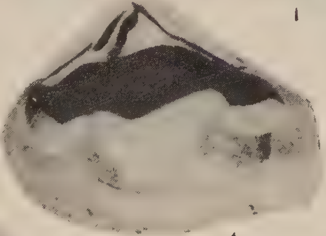
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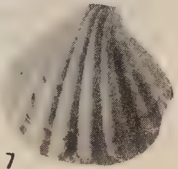
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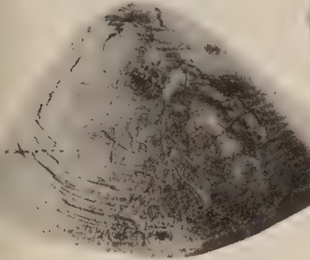
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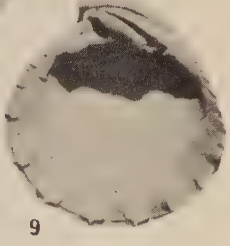
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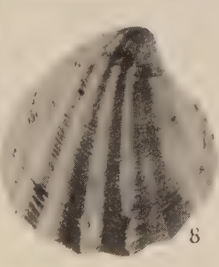
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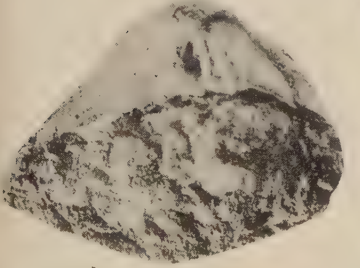
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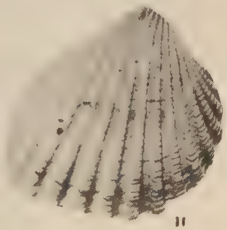
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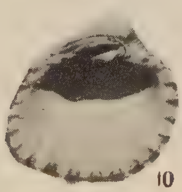
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EXPLANATION OF PLATE 4

FIGURE	PAGE
1—**Venericardia dominica** new name. Near Piedras de Afilar, Atlantico. Interior of right valve. Alt. 24 mm; Long. 25 mm.	17
2—**Chama corticosaformis** Weisbord n. sp. Exterior of lower (right) valve. Alt. 45 mm; Long. 42 mm.	18
3—**Chama corticosaformis** Weisbord n. sp. Interior of same specimen.	18
valve. Alt. 37 mm; Long. 36 mm.	18
4—**Chama corticosaformis** Weisbord n. sp. Exterior of upper (left)	
5—**Echinochama antiquata?** Dall. Near Tuberá, Atlantico. Broken left valve.	19
6—**Cardium (Laevicardium) serratum** Linnaeus. Near Usiacuri, Atlantico. Left valve. Alt. 43 mm; Long. 36 mm.	20
7—**Cardium (Cerastoderma) brantlyi** Weisbord n. sp. Morro Hermoso, Atlantico. Exterior of right valve. Alt. 85 mm; Long. 77 mm.	19
8—**Chione (Lirophora) latilirata colombiana** n. subsp. Exterior of right valve. Alt. 26 mm; Long. 30 mm.	22
9—**Chione (Lirophora) latilirata colombiana** n. subsp. Exterior of right valve. Alt. (partial) 20 mm; Long. 25 mm.	22
10—**Chione (Lirophora) latilirata colombiana** n. subsp. Interior of same specimen.	22
11—**Chione (Lirophora) usiacurina** Weisbord n. sp. Near Usiacuri, Atlantico. Exterior of left valve. Alt. 23 mm; Long. 28 mm.	23
12—**Antigona (Dosina) caribbeana** Anderson. Near Usiacuri, Atlantico. Alt. 145 mm; Long. 125 mm.	21

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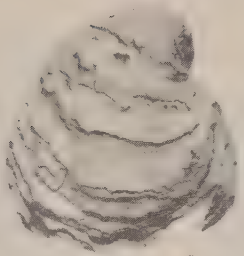

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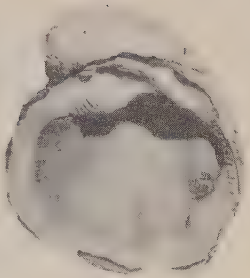

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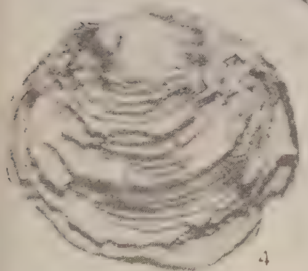

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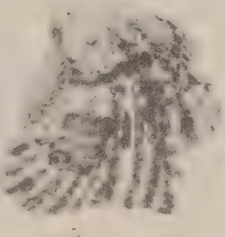

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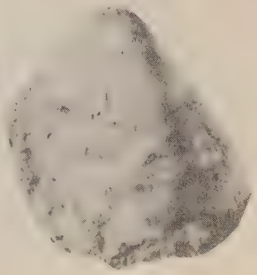

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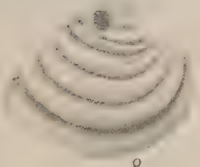

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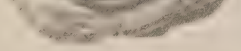

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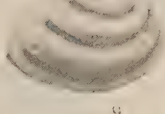

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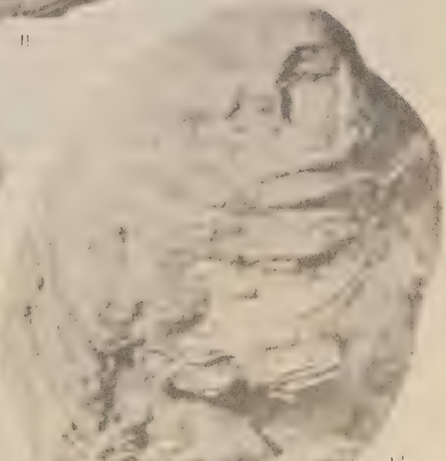

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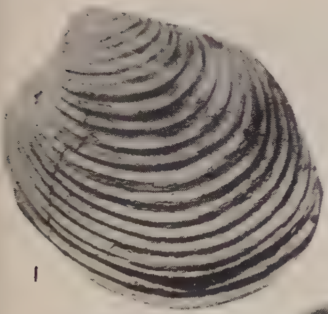
EXPLANATION OF PLATE 5

FIGURE		PAGE
1	**Clementia dariena** Conrad. Usiacuri, Atlantico. Left valve. Alt. 23 mm; Long. 28 mm.	24
2	**Chione (Chione) bolivarensis** Weisbord n. sp. Jesús del Monte, Bolivar. Exterior of right valve. Alt. 20 mm; Long. 23 mm.	22
3	**Chione (Chione) bolivarensis** Weisbord n. sp. Same specimen showing radial ribs on and adjacent to the lunule.	22
4	**Asaphis delicatus** Weisbord n. sp. Venezuelan specimen from near Urumaco, Falcon. Exterior of right valve. Alt. 42 mm; Long. 59 mm.	25
5	**Asaphis delicatus** Weisbord n. sp. Colombian specimen from Usiacuri, Atlantico. Left valve. Approximate dimensions, Alt. 42 mm; Long. 56 mm.	25
6	**Metis trinitaria colombiensis** n. subsp. Near Usiacuri, Atlantico. Exterior of right valve. Alt. 46 mm; Long. 60 mm.	24
7	**Corbula (Cuneocorbula) hexacyma** Brown & Pilsbry. Near Jesús del Monte, Bolivar. Interior of right valve. Alt. 13 mm; Long. 21 mm.	25
8	**Corbula (Cuneocorbula) hexacyma** Brown & Pilsbry. Exterior of left valve. Alt. 12 mm; Long. 18 mm.	25
9	**Corbula (Cuneocorbula) hexacyma** Brown & Pilsbry. Exterior of right valve. Alt. 13 mm; Long. 21 mm.	25
10	**Dentalium (Fissidentalium) solidissimum** Pilsbry & Brown. Specimen showing spiral striæ on earlier portion of shell.	26
11	**Dentalium (Fissidentalium) solidissimum** Pilsbry & Brown. Portion of adult specimen showing broad, flat ribs.	26
12	**Conus colombiensis** Weisbord n. sp. Near Tuberá, Atlantico. Alt. 58 mm; Width 34 mm.	50
13	**Cythara heptagona?** Gabb. Alt. 15 mm; Width 7 mm.	55
14	**Cythara heptagona?** Gabb. Rear view of same specimen.	55
15	**Surcula nuevagranada** Weisbord n. sp. Near Puerto Colombia, Atlantico. Alt. 37 mm; Width 14 mm.	54
16	**Drillia puertocolombiana** Weisbord n. sp. Near Puerto Colombia, Atlantico. Approximate dimensions, Alt. 43 mm; Width 16 mm.	55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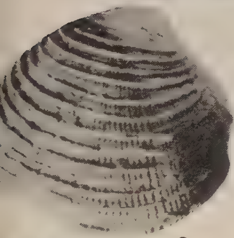
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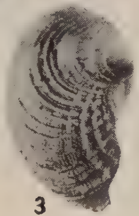
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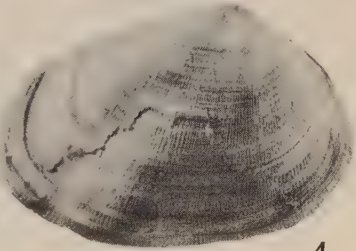
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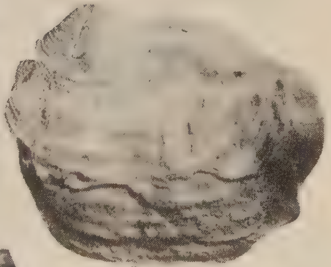
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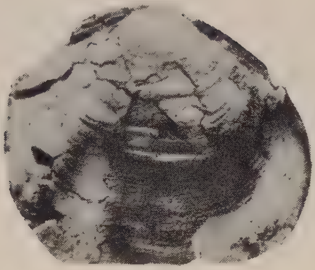
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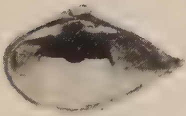
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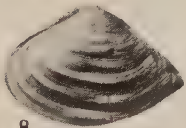
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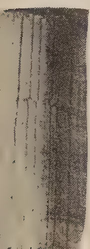
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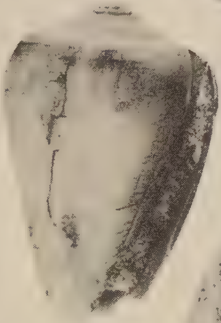
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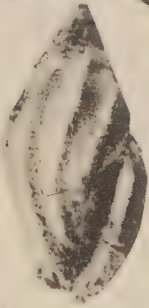
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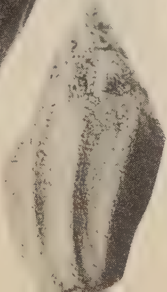
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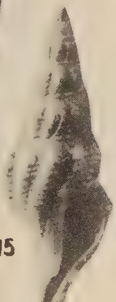
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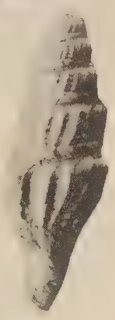
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EXPLANATION OF PLATE 6

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10—**Cancellaria rowelli** Dall. Rear view of same specimen.	50
11—**Mitra colombiana** Weisbord n. sp. Alt. 26 mm; Width 8 mm.	47
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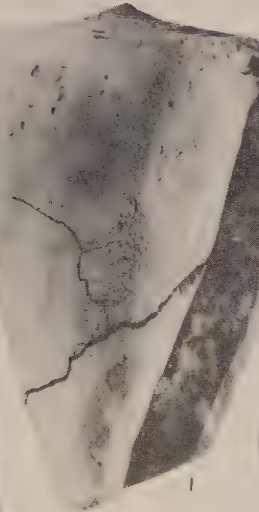
16—**Solenosteira cochlearis** Guppy var. **magdalenensis** Weisbord n. var. Near Piedras de Afilar, Atlantico. Alt. 35 mm; Width 22 mm.	46
17—**Solenosteira cochlearis** Guppy var. **magdalenensis** Weisbord n. var. Rear view of same specimen.	46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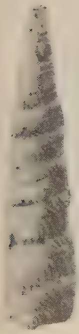
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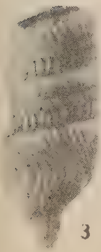
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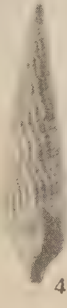
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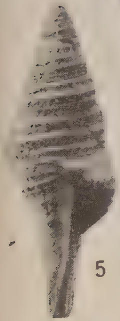
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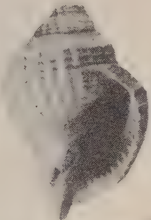
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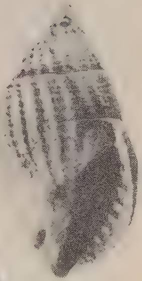
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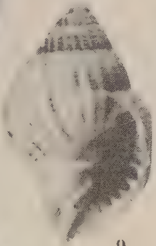
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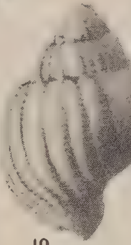
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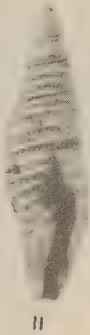
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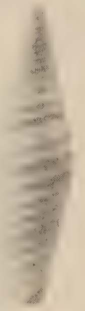
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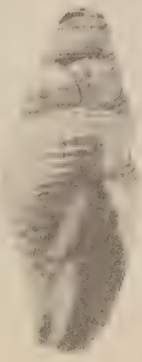
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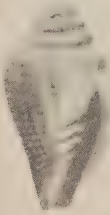
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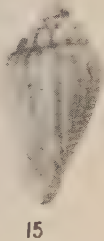
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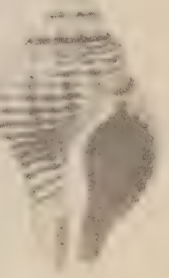
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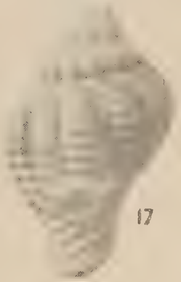
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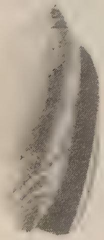
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EXPLANATION OF PLATE 7

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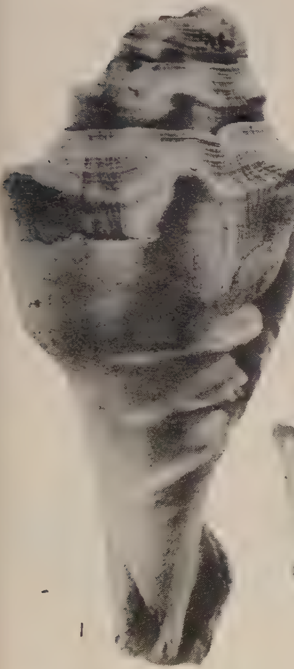
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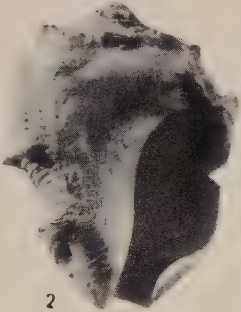
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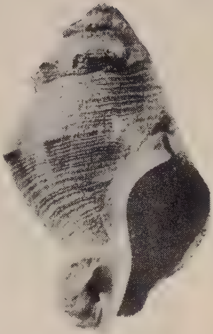

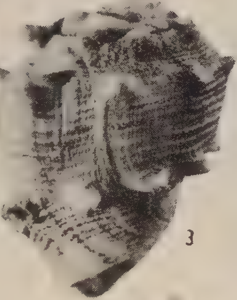
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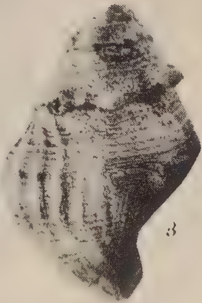
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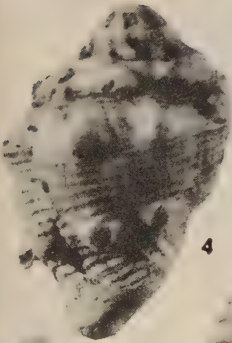
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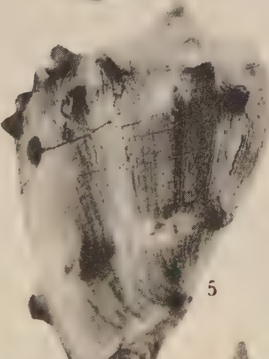
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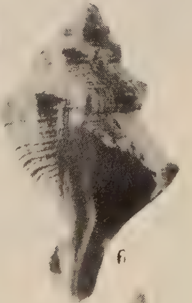
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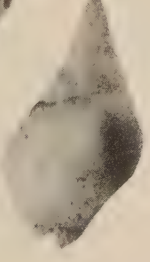
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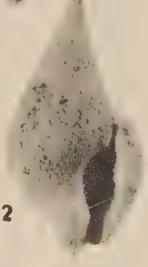
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EXPLANATION OF PLATE 8

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13—**Serpulorbis papulosus?** Guppy.	35
14—**Turritella vistana colombiana** n. subsp. Alt. 55 mm; Width 14 mm.	32
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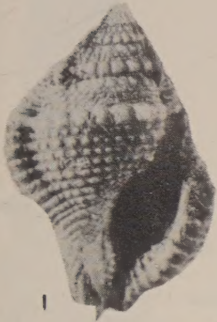
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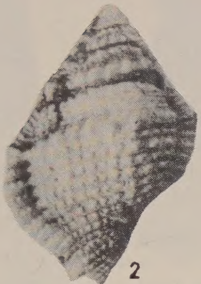
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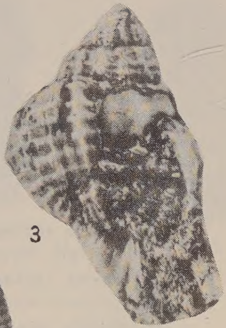
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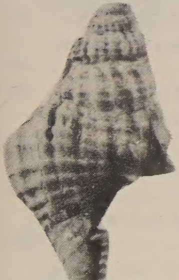
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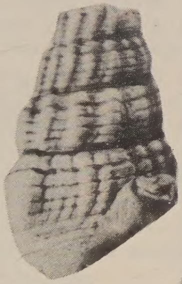
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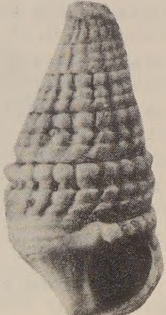

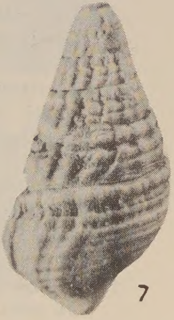
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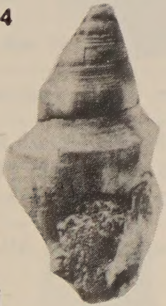
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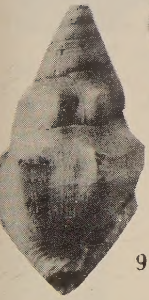
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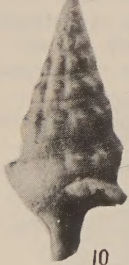
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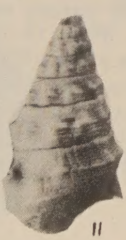
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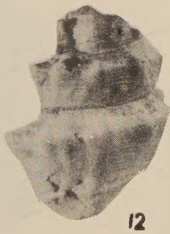
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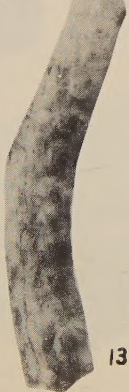
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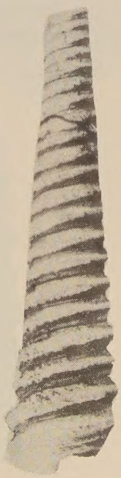
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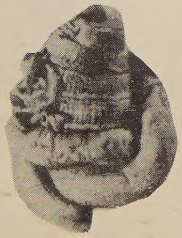
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EXPLANATION OF PLATE 9

FIGURE	PAGE
1—**Turritella cartagenensis** Pilsbry & Brown. Adult specimen of four and a half whorls. Alt. 55 mm; Width 20 mm.	30
2—**Turritella cartagenensis** Pilsbry & Brown. Specimen showing carinate early whorls. Alt. 45 mm; Width 15 mm.	30
3—**Turritella supraconcava** Hanna & Israelsky var. **fredeai** Hodson. Two basal whorls of adult specimen. Alt. 42 mm; Width 28 mm.	30
4—**Turritella supraconcava** Hanna & Israelsky var. **fredeai** Hodson. Alt. 36 mm; Width 21 mm.	30
5—**Turritella lloydsmithi** Pilsbry & Brown. Alt. 50 mm; Width 17 mm.	34
6—**Turritella lloydsmithi** Pilsbry & Brown. Adult specimen. Lower three whorls. Alt. 43 mm; Width 23 mm.	34
7—**Turritella gatunensis** Conrad. Three medial whorls. Alt. 22 mm; Width 11 mm.	33
8—**Turritella** cf. **gatunensis taratarana** Hodson. Three medial whorls. Alt. 19 mm; Width 9 mm.	34
9—**Turritella altilira** Conrad var. **atlanticensis** Weisbord n. var. Holotype. Alt. 30 mm; Width 13 mm.	32
10—**Turritella** cf. **falconensis** (Williston) Hodson. Alt. 25 mm; Width 15 mm.	31
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13—**Natica canrena (Linnaeus)** Moerch. Alt. 25 mm; Width 22 mm.	28
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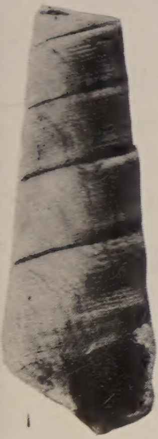
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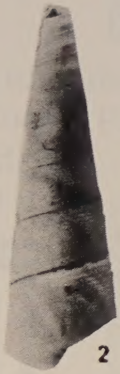
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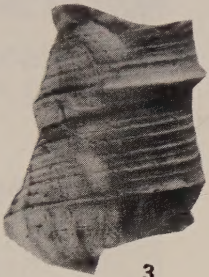
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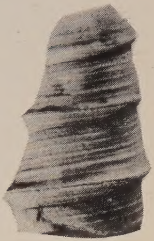
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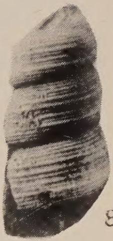
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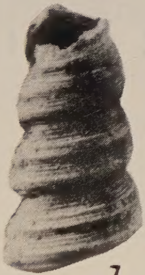
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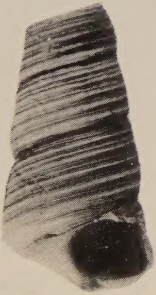
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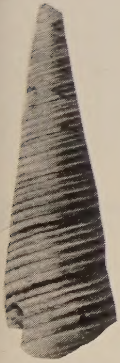
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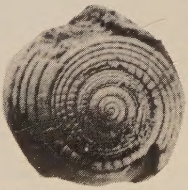
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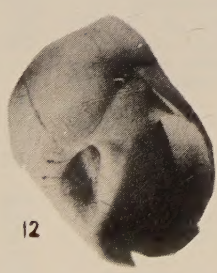
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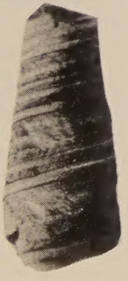
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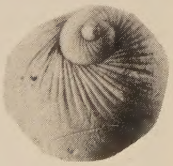
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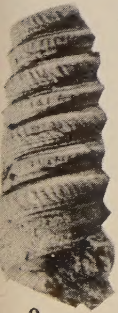
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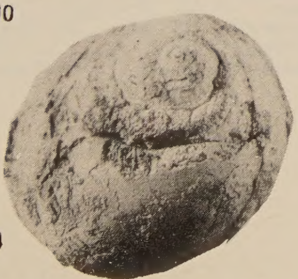
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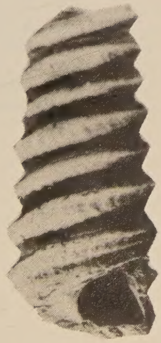
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